# A Reclassification of the Genera of North American Meloidae

Edwin C. Van Dyke

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# A RECLASSIFICATION OF THE GENERA OF NORTH AMERICAN MELOIDAE (COLEOPTERA)

AND

# A REVISION OF THE GENERA AND SPECIES FORMERLY PLACED IN THE TRIBE MELOINI, FOUND IN AMERICA NORTH OF MEXICO, TOGETHER WITH DESCRIPTIONS OF NEW SPECIES

BY

EDWIN C. VAN DYKE

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## INTRODUCTION

The Meloidae or family of blister beetles is one of the larger families of heteromerous Coleoptera and one of the most compact and distinctly isolated, biologically as well as morphologically. Its members are to be found throughout the warmer and temperate parts of the world though they are but poorly represented in Australia and the south temperate regions generally, in spite of the fact that the family is probably a very old one. It is well represented in North America and as a result has claimed the attention of our best workers. The last complete revision of the North American species of the family was that of LeConte (1853). Later revisions of the genera were made by Horn (1868), LeConte and Horn (1883), and Wellman (1910), and were useful in better defining the genera and in amplifying the tables so as to receive the species later made known. Champion (1892) in general followed these last mentioned workers in dealing with the Mexican species as did also Leng (1920) in his Catalogue of Coleoptera. The accepted classification, however, was not perfectly satisfactory to the critical worker, and Horn (1894) went so far as to state that one of the tribes, the Meloini, as at present constituted was an unnatural group wherein had been placed a miscellaneous assemblage of genera simply because they were wingless. My own studies of the family, which have in the main been limited to this tribe, have led me to accept his view, and, in order to logically carry it out, I have abolished the old tribe and placed the various genera and species in a new alignment. This has, of course, made necessary the revamping of the entire family. In this paper, I will therefore first outline the proposed new classification for the entire family, and then discuss in detail the genera and species formerly placed in the tribe Meloini.

### Sources of Material

As a preparation for my study, I first carefully examined the series of Meloidae in collections of the following institutions: Cornell University; the Museum of Comparative Zoology of Harvard University, especially the LeConte collection; the Boston Museum where is housed the Harris collection; the American Museum of Natural History at New York; the American Entomological Society at the Academy of Natural Sciences of Philadelphia, particularly the Horn

collection; and the United States National Museum. I have also had, during the preparation of my paper, the material from my own collection, now a part of the collection of the California Academy of Sciences, the general collection of the Academy, that of Stanford University, the University of California, and the private collection of Dr. F. E. Blaisdell. For the study of the tribe Meloini, I have had, in addition to material included in the above mentioned collections, loans of a representative series of the genus *Meloe* from the United States National Museum, as well as most of the specimens of *Meloe* belonging to Professor H. F. Wickham, Dr. F. E. Blaisdell, Mr. Ralph Hopping, Mr. J. O. Martin, and Mr. E. R. Leach. I have thus had more or less continuously before me representatives of all the North American genera of Meloidae except two, and most of the species. In the tribe Meloini as formerly constituted, I have studied all the types in American collections and have had in my possession specimens of every known species found within our territory, some represented by considerable series and from many parts of their range.

ACKNOWLEDGMENTS

For the opportunity to study this material, I am indebted to the custodians of the public collections named above: Dr. J. C. Needham, of Cornell University, Mr. Samuel Henshaw and Mr. Nathan Banks, of the Museum of Comparative Zoology at Harvard University, Mr. C. W. Johnson, of the Boston Museum, Dr. Frank E. Lutz and Mr. A. J. Mutchler, of the American Museum of Natural History, the late Dr. Henry Skinner and Mr. E. T. Cresson, Jr., of the Philadelphia Academy of Natural Sciences, Dr. L. O. Howard, Mr. E. A. Schwartz, and Mr. H. S. Barber, of the United States National Museum, Professor R. W. Doane, of Stanford University, and Mr. E. P. Van Duzee, of the California Academy of Sciences. I have also received assistance through the loan of specimens from such good friends as Professor H. F. Wickham, of the University of Iowa, Mr. Warren Knaus, of McPherson, Kansas, Dr. F. E. Blaisdell, of San Francisco, Mr. Ralph Hopping, of Vernon, British Columbia, Mr. E. R. Leach, of Piedmont, California, Mr. J. O. Martin, of Berkeley, and my associates in the University of California. To Mr. Nathan Banks, Dr. Henry Skinner, Mr. Henry Wenzel, Mr. Philip Laurent, Mr. Charles Liebeck, Mr. Ralph Hopping, Mr. L. C. Lane, Dr. F. X. Williams, and Mr. J. August Kusche, I am also under obligations for numerous specimens.

Without the aid from these, as well as many others, it would have been impossible for me satisfactorily to complete this review.

The bibliography has been limited to essential citations or such as are of most importance to American students. The illustrations have been made with a view to bringing out not only the fundamental characters but also many of the other interesting and peculiar details. For these I am under obligations to Mrs. Frieda Abernathy, who has done her work in a most excellent manner.

## CLASSIFICATION OF NORTH AMERICAN MELOIDAE

The family Meloidae, according to most recent authorities, is divisible into two subfamilies, the Meloinae[1] and the Nemognathinae.[2] The Meloinae are defined by having the tarsal claws cleft to the base, the upper blade without serrations, or by being toothed. The pseudochrysalis is not confined in the exuvia of the preceding larval instar and the male genitalia are disposed vertically or obliquely in the abdomen. The Nemognathinae have the tarsal claws cleft to the base, the upper blade with serrations, or simple and with but a slight or indistinct tooth at the base. The pseudochrysalis is confined in the exuvia of the preceding larval instar and the male genitalia is disposed horizontally in the abdomen (Wellman, 1910). Boving (1924) also definitely separated the latter subfamily by larval characters. In the Meloinae, I recognize three tribes: the Mylabrini, the Meloini, and the Colospastini.

The Mylabrini is an Old World group, dominant in the more arid parts of Africa and Asia but with intrusions into Europe and the Oriental region of Asia, though not found in the Malayan subregion nor in Australia. The only American insect which has been listed as a member of this tribe is *Cordylospasta fulleri* Horn, a very anomalous species which was placed here by Horn (1875). In spite of its short and somewhat clubbed antennae, which are characteristic of that tribe, I do not believe that it belongs here, for it has in addition,

[1] The subfamily Meloinae as I am using it corresponds to the same as used by Escherich (1897), Ganglbauer (1907), and Leng (1920), and to the Lyttinae as used by Wellman (1910) and Borchmann (1917). I see no valid reason for substituting the name Lyttinae for the older Meloinae as was done by Wellman (1910).

[2] The subfamily Nemognathinae as I use it is also the same as used by Borchmann (1917) and the equivalent of the Zonitidae of Escherich (1897), and the Zonitinae of Ganglbauer (1907), Wellman (1910, and Leng (1920). As stated by Cockerell (1910), the subfamily name Zonitinae has prior right for a subfamily of Mollusca.

tarsal claws which are toothed, not cleft from apex to base as is the case with all true Mylabrini. The claw structure is similar to that found among the Colospastini. Moreover it lives in Nevada, which is a part of that semi-desert area in the southwestern part of the United States and northwestern Mexico which is the home of all the members of the Colospastini. The majority of this tribe also have rather short antennae and several have them somewhat clubbed. In a new genus, *Brachyspasta*, which I am establishing, the species upon which it is founded and which I consider an undoubted member of the Colospastini, has the antennae short and clubbed as in the Mylabrini. It also approaches *Cordylospasta* in regard to another peculiarity, the reduction of the number of antennal segments through ankylosis, *Brachyspasta* having but ten segments through the union of the tenth and eleventh and *Cordylospasta* but eight through the union of the eighth, ninth, tenth, and eleventh. I have, therefore, removed *Cordylospasta* from the Mylabrini and placed it in the Colospastini, thus leaving America without a single representative in the former tribe.

The tribe Meloini as I am using it is the same as the Cantharini of LeConte and Horn (1883), and the Lyttini of Wellman (1910), Leng (1920), and Borchmann (1917). With the abolishing of the tribe Meloini as a group of wingless Meloidae and the placing of the type genus *Meloe* near *Lytta* and within the tribe to which *Lytta* belongs, it follows as a consequence that the name Meloini will take precedence over that of Lyttini for the tribe, seeing that the genus *Meloe*, upon which it is founded, is the oldest of the meloid genera. The tribe as thus constituted is a group of definitely related genera. They all possess the fully cleft tarsal claws, the upper blade without serrations, the mouthparts without special modification except in *Gnathospasta*, and the antennae either filiform or moniliform, the latter type sometimes with the median segments enlarged in the male or the outer segments gradually enlarged, but never with the outer segments very transverse and formed into a club, as is the case with the Mylabrini. The members of the tribe are to be found in all of the temperate and tropical parts of the world except Australia. Within our territory, there are eleven genera. *Tetraonyx*, distinguished by having the penultimate tarsal segment bilobed, is typically a neotropical or South American genus with a small number of species in Mexico and but four within the boundaries of the United States. It is distinctly an isolated genus at least as far as our fauna

is concerned. *Pleuropompha* and *Gnathospasta* are monotypical genera with somewhat specialized features yet they are undoubtedly offshoots of *Epicauta*. *Epicauta* is a very large genus found in both hemispheres. While it is quite definite as regards its main characteristics and is probably the basic stock of those meloids having filiform or setaceous antennae and thighs with sericeous patches, it is yet exceedingly variable, as would be expected in such a large, old, and widely distributed genus. In our country it has given off not only the two rather specialized genera just mentioned, but also the genus *Macrobasis*, characterized by having the basal antennal segment long and in the male often the second segment as well, and the genus *Henous*, which is a typical *Epicauta* except for the fact that it is wingless and has the elytra reduced in length. *Macrobasis* is restricted to eastern and middle North America, and *Henous* to the semi-arid regions flanking the southern Rocky Mountains. The five genera, *Pyrota*, *Pomphopoea*, *Lytta*, *Poreospasta*, and *Meloe*, belong to another stock which centers around *Lytta*. *Lytta* is likewise a genus found in both the Old and the New World. It is in the main characterized by having the fully cleft non-serrate tarsal claws, the thighs without sericeous patches, and the antennae more or less moniliform and with a tendency to distortion in the male. *Pyrota*, while dominantly a lyttine insect, shows by its more filiform antennae that it is somewhat generalized. It is of moderate size and found in the eastern portion of our country, in Mexico, and extends into South America. It no doubt originated to the south of us. *Pomphopoea* is but a slightly modified *Lytta* and is restricted to eastern North America. *Poreospasta* and *Meloe*, which will be dealt with later on in greater detail, are also offshoots of *Lytta* which have diverged mainly along lines of degeneration. The tribe Meloini in North America I thus consider to be an assemblage of three main stocks focused around *Tetraonyx*, *Epicauta*, and *Lytta*.

The tribe Colospastini, as I have constituted it, is characterized by having the antennae of but moderate length, more or less filiform, at times with a tendency toward clubbing, and sometimes with the outer segments ankylosed; the mouthparts quite normal; and the tarsal claws provided with a single tooth which is always connate with it and shorter than the claw itself, the claw also never serrate. The tribe is restricted to North America and confined to the semi-arid portions of our own southwest and the adjacent parts of Mexico, to the true Sonoran zoogeographical region and its offshoots. It

undoubtedly also originated within this territory and probably all of the genera are of *Colospasta* ancestry. The genus *Colospasta* is without doubt the most generalized as well as the largest and most widely dispersed of the tribe. This latter in its turn also shows a certain degree of relationship to *Epicauta.* Most of the genera show a tendency toward peculiar and grotesque modifications, both specific and sexual, and four of the genera show marked degeneration with regard to wings. It is a group which is eminently terrestrial, even the winged individuals using their wings but seldom. I am of the belief that the desert environment is accountable to a very great extent for this fact and that the habit of traveling from place to place over the ground, instead of flying, has brought about the modifications of the tarsal claws, these modifications all being in the nature of a degeneration of the primitive cleft claw and an adaptation from the arboreal to a terrestrial habit. With the establishment of the terrestrial life, there has been made possible the reduction and final atrophy of the wings and the development of those peculiar and hypertrophic features which are so characteristic of the terrestrial desert Coleoptera. *Colospasta* contains thirteen species mostly confined to southern California and Arizona but with one in Colorado and New Mexico and another in Mexico. The claws in the species of this genus are decidedly variable; in the more generalized species like *Colospasta elegans* (Lec.), the tooth is almost as long as the claw, narrow, and closely parallel with it, while in the more divergent forms like *Colospasta moesta* Horn, the tooth is shorter, more robust, more definitely connate with the claw, and less parallel. *Pleurospasta* is closely related to *Colospasta* but is separated from it mainly by the bilobed pronotum, costate elytra, and simple tarsi of the males. It is rather widely distributed throughout southwestern Utah, Arizona, and southeastern California. *Negalius,* with one species, looks much like a robust *Epicauta maculata* (Say). It ranges from western Texas through Arizona into Lower California. The claw teeth are about one-half the length of the claw, sharp, and divergent. *Eupompha* with one species from Texas and *Phodaga* with one species from southern California both have their heads specially modified and the legs of the males also oddly developed. The claw teeth in both are almost as long as the claws and but slightly divergent. *Tegrodera,* with two very closely related species in southern California and the adjacent parts of Arizona, is robust and definitely terrestrial, often traveling in army formation from place to place. The teeth of the

claws are about one-half their length, large, sharp, and very divergent. *Cordylospasta* we have mentioned previously as having been removed from the Mylabrini to the Colospastini. The teeth of the claws are one-half their length, much as they are in the majority of the winged species of the tribe. The antennae have diverged greatly, as we have previously stated, and so have the tibial spurs, being long and single instead of double as they usually are. *Gynaecomeloe, Megetra, Brachyspasta,* and *Cysteodemus* are wingless members of the tribe which will be discussed more in detail later on.

In the subfamily Nemognathinae there are three tribes: Sitarini, Horiini, and Nemognathini. The tribe Sitarini was established for *Sitaris,* a peculiar European genus characterized in the main by being winged yet having the elytra very much narrowed posteriorly so that they do not fully cover the wings. To this tribe Riley (1877) assigned his *Hornia minutipennis,* a very anomalous, wingless meloid with much abbreviated elytra. It was placed here partly because it had habits similar to the European species of *Sitaris,* being parasitic during the larval stage in the nests of large solitary bees, and partly because of the triungulins, or first larval instars. Boving (1924), in his recent work on the early stages of these insects, is in agreement with this opinion. The adults of *Hornia,* however, are quite different from *Sitaris* especially as regards the elytra and claws. The claws of the former were stated by Riley (1877) to be simple, but that is incorrect. The claws have a blunt tooth at the base with a small spicule projecting from it which is no doubt lost in old or worn specimens and represents the remains of the normal lower blade of the claw. The genus *Leonidia* was proposed by Cockerell (1900) to replace *Leonia* of Dugès (1889), as the latter was found to have been previously used in zoology, and to contain his species *neomexicana* as well as the Mexican species of Dugès. The genus was separated from *Hornia* because of the belief that *Hornia* had simple tarsal claws whereas *Leonidia* had claws with an acute tooth at base. I have carefully examined the claws of both and find them quite similar though the tooth is less reduced in *Leonidia.* Specimens of *Leonidia neomexicana* Ckll. received from Mr. Warren Knaus, which had been pronounced typical by Mr. H. C. Fall after comparison with paratypes in his collection, cannot be distinguished from paratypes of *Hornia gigantea* Wellm. which I have in my collection. I am also informed that Mr. Fall believes them to be the same. Therefore, I would suppress the genus *Leonidia* entirely unless the Mexican species

can be shown to be generically distinct from *neomexicana* Ckll., would reduce *Hornia gigantea* Wellm. to the position of a synonym of *neomexicana* Ckll., and place this within the genus *Hornia*. The recent paper of Mickel (1928) which revises the genus *Leonidia* would accordingly have to be revised by replacing *Leonidia* with *Hornia* and including *minutipennis* Riley as a fourth species in his table of species. *Tricrania* is now also placed within the Sitarini by Boving (1924). This contains three species. The genus *Tricranoides* of Wellman (1910), I cannot recognize. It was erected for the reception of *Tricrania stansburni* (Hald.) upon the strength of its being fully winged and with a double row of teeth on the upper blade of the tarsal claws. This last character is very variable as it is in *Nemognatha*. In some of my specimens I could see the double row of teeth only on one or two of the claws, while in others I could find only the single row as they are in typical *Tricrania sanguinipennis* (Say). The presence of wings in *stansburni* as against their absence in *sanguinipennis*, I would not consider sufficient for generically separating them. There are many genera which contain both winged and wingless species, including that of *Macrobasis* among the Meloidae.

Horiini, I think should be recognized as a distinct tribe. The large size and peculiar appearance of the species which would fall within it, as well as their distribution throughout the humid tropics, taken in connection with their physical characters, would seem to warrant giving them such a status. Within our territory there is but one genus, *Horia*, with one species, *auriculata* Champ. This has recently been placed in the genus *Cissitis* Latr. by Borchmann (1917). The characters for separating the latter are very weak and I believe not sufficient for giving it more than subgeneric rank.

The tribe Nemognathini is world-wide in its distribution and evidently very old for it is the one tribe which has representatives in Australia. Its distinctive characters are the cleft claws with the upper blade serrate (at least in all of our species), the mouth parts somewhat elongated, and the outer maxillary lobe (galea) greatly elongated in two of our genera. We have but three genera: *Zonitis*, *Gnathium*, and *Nemognatha*. The first and last are found in both the Old and the New World, while the second is confined to this country. *Zonitis* has the outer maxillary lobe but slightly elongated, if at all, while it is greatly elongated in the other genera. Champion (1892) states that there are certain Mexican species which seem, as regards the maxilla, to be intermediate between *Zonitis* and *Nemognatha;* yet

he keeps the two genera. The European species of both genera are distinctly isolated, as are also those found within our territory, so I think that it is best for the present to recognize them both. *Gnathium* is a very weak genus, an offshoot of *Nemognatha* and only separated from it structurally by having shorter and more club-like antennae. The species are in general much smaller than are those of *Nemognatha*.

The Meloidae as far as known are all parasitic, using the term in a broad sense, living in the larval stage upon the eggs and stored food of bees or other Hymenoptera or within the egg masses of grasshoppers. Of the Meloini, *Meloe* and *Lytta* live in bees' nests, and *Epicauta*, *Macrobasis*, and *Henous* live upon grasshopper eggs. Of none of the Colospastini are the early stages known. It would be most interesting to have some of these worked out, for it may be possible that they have different food hosts. Many like *Tegrodera* and *Megetra* are often abundant where neither bees nor grasshoppers are numerous. All the Nemognathinae are believed to live at the expense of bees or other Hymenoptera.

## GENERIC KEY

1. Tarsal claws either cleft to base without serrations or with distinct tooth. Subfamily Meloinae ..... 2
   Tarsal claws cleft to base with serrations on upper blade of claw or with upper blade simple and lower, a much reduced tooth near base of claw, species with latter type of claws also with very short elytra. Subfamily Nemognathinae ..... 28
2. Antennae short and clavate; tarsal claws cleft to base. Tribe Mylabrini.
   Antennae short or of moderate length, never markedly clavate ..... 3
3. Antennae of moderate length; tarsal claws cleft to base. Tribe Meloini. 4
   Antennae rather short and more or less filiform; tarsal claws strongly toothed, the tooth shorter than claw and connate with it. Tribe Colospastini ..... 16
4. Penultimate segment of tarsi bilobed ..... **Tetraonyx** Latr.
   Penultimate segment of tarsi not bilobed ..... 5
5. Anterior femora with a sericeous patch, antennae filiform or setaceous ..... 6
   Anterior femora without a sericeous patch ..... 12
6. Species fully winged, elytra long ..... 7
   Species apterous, elytra somewhat shortened ..... 11
7. First antennal segment of but moderate length ..... 8
   First antennal segment greatly enlarged and lengthened ..... 10
8. Second segment of antennae equal to half of third, elytra costate ..... **Pleuropompha** Lec.
   Second segment of antennae very short, elytra not costate ..... 9
9. Mandibles prolonged, meeting beyond the labrum ..... **Gnathospasta** Horn
   Mandibles short ..... **Epicauta** Redt.
10. ..... **Macrobasis** Lee.
11. ..... **Henous** Hald.

12. Antennae filiform, outer segments cylindrical ..... **Pyrota** Lec.
    Antennae robust externally, segments moniliform ..... 13
13. Species fully winged, elytra long ..... 14
    Species apterous, elytra somewhat shortened ..... 15
14. Labrum deeply emarginate ..... **Pomphopoea** Lec.
    Labrum slightly emarginate ..... **Lytta** Fab.
15. Elytra meeting along suture ..... **Poreospasta** Horn
    Elytra overlapping at suture, imbricated ..... **Meloe** Linn.
16. Species fully winged in both sexes, elytra long ..... 17
    Species with one or both sexes wingless and with shortened elytra ..... 24
17. Antennae eleven-segmented ..... 18
    Antennae eight-segmented ..... 23
18. Vertex of head elevated above into a sharp peak ..... **Phodaga** Lec.
    Vertex of head not greatly elevated ..... 19
19. Labrum deeply emarginate ..... 20
    Labrum not emarginate ..... 21
20. Elytra with patches of short gray hair irregularly dispersed.... **Negalius** Casey
    Elytra glabrous throughout and bicolored ..... **Tegrodera** Lec.
21. Vertex and front of head deeply sulcate ..... **Eupompha** Lec.
    Front of head at most sulcate ..... 22
22. Pronotum bilobed elytra costate ..... **Pleurospasta** Wellm.
    Pronotum not bilobed, elytra not costate ..... **Colospasta** Lec.
23. ..... **Cordylospasta** Horn
24. Males with wings and elytra normal ..... **Gynaecomeloe** Wellm.
    Males as well as females wingless ..... 25
25. Elytra considerably shortened and more or less diverging ..... 26
    Elytra large and connate along suture, apex of abdomen alone exposed, antennae eleven-segmented ..... 27
26. Elytra meeting at suture near base, antennae ten-segmented ..... **Brachyspasta** gen. nov.
    Elytra generally diverging from scutellum, antennae eleven-segmented ..... **Megetra** Lec.
27. ..... **Cysteodemus** Lec.
28. Antennae short and robust, segments somewhat moniliform, third segment not more than twice as long as broad ..... 29
    Antennae of moderate length, more or less filiform, third segment considerably more than twice as long as broad, upper blade of claw serrate. Tribe Nemognathini ..... 32
29. Second antennal segment shorter than third, tarsal claws broad at base; large species, over 2 cm. in length. Tribe Horiini ..... 30
    Second antennal segment longer than third; tarsal claws not especially broad at base; small or moderate in size, never 2 cm. in length. Tribe Sitarini ..... 31
30. Claws serrate, last segment of maxillary palpi shorter than third.... **Horia** Fab.
31. Claws serrate, last segment of maxillary palpi not shorter than third ..... **Tricrania** Lec.
    Claws not serrate, wingless and with elytra much reduced in length ..... **Hornia** Riley
32. Maxillae with the outer lobe not prolonged ..... **Zonitis** Fab.
    Maxillae with the outer lobe prolonged ..... 33
33. Antennae not broadened externally ..... **Nemognatha** Ill.
    Antennae broader externally ..... **Gnathium** Kby.

## REVIEW OF THE TRIBE MELOINI AS FORMERLY CONSTITUTED

The tribe Meloini, as defined by LeConte (1862), contained those Meloidae which were without wings and in which, in most cases, the elytra was shorter than the abdomen, in one genus imbricated or overlapping laterally; the metasternum was very short so that, except in *Henous*, the middle coxae extended partly over the hind coxae; the elytra entirely covering the side pieces of the meso- and metasternum; the tarsal claws sometimes armed with a tooth, sometimes cleft to the base, the upper blade never serrate or pectinate; the frontal suture distinct and the front prolonged before the insertion of the antennae. As so constituted the tribe contained, in the Old World, but the single genus *Meloe* and in the New World, in addition, the genera: *Gynaecomeloe*, *Cysteodemus*, *Megetra*, *Poreospasta*, *Henous*, and *Nomaspis* in North America; and *Gynapteryx*, *Pseudomeloe*, and *Meloetyphus* in South America. When we critically examine these genera we find that they have in common but one fundamental character, namely the absence of wings. The reduction in size of the metasternum and the overriding of the middle coxae by the posterior, together with the enclosing of the side pieces of the meso- and metathorax by the elytra, resulted as a necessary consequence of the loss of wings, of the atrophy of the muscles which controlled them, and the secondary reduction in size of the sclerites which supported the muscles. The absence of wings, moreover, is not a character confined to the members of this tribe, for we have elsewhere in the Meloidae a number of wingless genera such as *Hornia*, while in *Macrobasis* and *Tricrania* we have wingless species. As regards other characters there is great divergence. The tarsal claws in the Meloidae, I am inclined to believe, have a far greater taxonomic value and phylogenetic significance than have previously been accredited them. Here there is great diversity. Of our genera, *Meloe*, *Henous*, *Nomaspis*—and also *Poreospasta* as I have recently found, contrary to the opinion of Horn (1868)—have the tarsal claws all cleft to the base, the two portions being of equal length and the lower portions more or less movable. This is the normal condition with the majority of the Meloidae and probably was also a universal character of the early or primitive members. In *Gynaecomeloe*, *Brachyspasta*, *Cysteodemus*, and *Megetra*, the tarsal claws are toothed,

the single tooth always shorter than the claw and connate with it. This is the condition which we find in six genera now included in the group Colospastides and listed within the tribe Lyttini (Leng, 1920). *Gynaecomeloe, Brachyspasta, Cysteodemus,* and *Megetra* agree with all the Colospastides in the rather short and generally filiform type of antennae, and also in their distribution, being limited to the semi-desert southwestern portion of the United States and northern Mexico, to the true Sonoran faunal region and its derivatives. *Meloe, Poreospasta,* and one species of *Nomaspis, Nomaspis sublaevis* Horn, agree in having antennae of moderate length and in being decidedly moniliform, at least outwardly, in this regard agreeing with the members of the genus *Lytta. Henous* and the second species of *Nomaspis, Nomaspis parvula* Hald., on the other hand, have somewhat filiform antennae. In addition they have the elliptical sericeous patch of golden hair on the anterior femora. Both of these features are characteristic of *Epicauta* and the closely allied *Macrobasis.*

I am therefore forced to the conclusion that mere alar atrophy, with the accommodating modifications which result, are of less taxonomic value than is generally believed and am compelled to accept the statement of Horn (1894) that the tribe Meloini is unnatural. The tribe as now limited, I propose to abolish. *Meloe* will be placed near *Lytta* as I have done in the table. It is no doubt a derivative of *Lytta. Nomaspis sublaevis* Horn, since it is not congeneric with *Nomaspis parvula* Hald. the genotype, will be removed from *Nomaspis* and also placed close to *Lytta.* With it will go *Poreospasta polita* Horn, a species which I have found to be congeneric with it. As the result of a necessary correction, the genus *Poreospasta,* which will receive the two species just mentioned, will have to be recharacterized. The description of *Poreospasta polita* Horn, the genotype of *Poreospasta,* was based upon imperfect specimens. According to Horn (1868), the lower blade of the divided tarsal claw was shorter than the upper. This was undoubtedly the case with the specimens he had, but they were broken specimens. I have carefully compared a series of specimens from my own collection with one of the paratypes of *Poreospasta polita* Horn, kindly loaned me by the Philadelphia Academy of Natural Sciences through Mr. E. T. Cresson, Jr. In some, which were old and wind blown as was the case with Horn's original material, there was a similar condition to that stated by Horn. In fresh specimens, all of the claws were completely cleft and the blades of equal length, as is the case with *Nomaspis sublaevis* Horn.

*Henous*, which is but a wingless *Epicauta*, will be placed near that genus and it will be made to include not only its type species, *Henous confertus* (Say), but *Nomaspis parvula* Hald. as well, for the latter is without doubt congeneric with it. The genus *Nomaspis* will as a result disappear or be merged with *Henous* as was done by Champion (1892). *Gynaecomeloe*, *Cysteodemus*, *Megetra*, and a new genus, *Brachyspasta*, will be placed in the group Colospastides which will be elevated to tribal rank as the tribe Colospastini. This will be characterized, as was the group Colospastides, mainly by the possession of tarsal claws which are toothed, not cleft, and with the tooth connate with the claw. It will also be made to include wingless as well as winged forms.

The genera mentioned above will now be dealt with in order and in a somewhat monographic manner. The measurements given will be from typical specimens. The degree of variation among the individuals of the species of Meloidae is so great that measurements are only of comparative value. The length of a species, except where otherwise stated, is from the vertex of the generally deflexed head to the apex of the elytra, not to the apex of the abdomen for the reason that the latter is very variable in living as well as in dead specimens and therefore unreliable. The measurement of the breadth, though given, is apt to be of little value, for it is made across the elytra, which curl or shrink to a greater or less degree.

## Genus **Henous** Haldeman

Plate 15, figures 1, 2

*Henous* Haldeman, Stansbury's Exped. Great Salt Lake, p. 377, 1852; LeConte, Proc. Acad. Nat. Sci., Phila., p. 330, 1853; Lacordaire, Gen. Col., vol. 5, p. 661, 1859; LeConte and Horn, Class. Col. Am., Smith. Misc. Coll., vol. 26, p. 416, 1883; Henshaw, List Col. Am., p. 130, 1885; Dugès, Bull. Soc. Zool. Fr., p. 580, 1886; Leng, Cat. Col. Am., p. 159, 1920; Borchmann, Junk's Col. Cat., Pars 69, p. 118, 1917; Champion, Biol. Centr.-Am., Col. Het., vol. 4 (2), p. 368, 1892.

*Nomaspis* LeConte, New Spec. Col., Smith. Misc. Coll., vol. 6, p. 156, 1886; Horn, Trans. Am. Entom., vol. 2, p. 140, 1868; Henshaw, List Col. Am., p. 130, 1885; Leng, Cat. Col. Am., p. 160, 1920.

Genotype, *Henous confertus* (Say)—

The genus *Henous* was erected by Haldeman in 1852 for the reception of his *Henous techanus*, later shown to be but a synonym of *Meloe confertus* Say (1823). It was stated to have the "form of *Epicauta*" but to differ from the members of that genus by having

the "elytra abbreviated, connate, and each obtusely rounded," the "antennae setaceous, third articulation longest; from the third to the sixth slightly dilated and compressed in the male" and the "ungues cleft, with the parts equal." *Nomaspis* was established in 1863 by LeConte with *Meloe parvus* Hald. as its type. It was removed from *Meloe* because the elytra were not imbricated or laterally overlapping, as in typical *Meloe*, were connate for about one-third of their length, and the scutellum evident. It was compared with *Henous* where the elytra were described as connate almost to the tips. In the Biologia Centrali-Americana, Champion (1892) united *Nomaspis* with *Henous*. To this union I thoroughly agree for I cannot see that *Henous confertus* (Say) and *Nomaspis parvula* (Hald.) differ generically from each other. The length of elytra and the extent to which they are united along the suture is but a matter of degree, a specific difference, not a generic one. *Nomaspis sublaevis* Horn, a species described at a later period and placed in *Nomaspis* by Horn, I do not consider at all congeneric with *parvulus*, chiefly on account of the type of antennae, as indicated previously, and I find that Horn (1894) at a later period was of the same opinion. I am therefore removing *sublaevis* Horn from this association and placing it in the genus *Poreospasta*. The Mexican species, *Henous mexicanus* Dugès, which is stated by Champion (1892) to resemble *sublaevis* closely, will also have to be removed if found truly congeneric. As thus reconstituted, the genus *Henous* Hald. would contain two species from our territory: *confertus* (Say) and *parvulus* (Hald.); and in addition the Mexican *cardui* Dugès, which according to Champion (1892) is very near to *confertus* (Say).

*Henous* may be defined as being a genus of meloid beetles, very close to *Epicauta* and probably derived from that stock. Like the latter, its members have antennae that are setaceous, not moniliform; the anterior femora with a sericeous patch formed of golden pile beneath; the penultimate tarsal segment cylindrical, not bilobed; and the tarsal claws cleft to the base, the two blades of equal length and the upper blade simple. In addition the species are apterous, with the elytra reduced in length, so that they average in life about two-thirds to three-fourths the length of the abdomen and are more or less connate along the suture. The mesocoxae do not overlap the metacoxae, though they approach close to them in *parvulus* (Hald.). From *Meloe*, with which it was formerly rather closely associated, its species differ by not having moniliform antennae, by having the

sericeous femoral patch, lacking in the other, by having the scutellum quite evident, and the elytra not laterally imbricated but with sutural margins straight and more or less connate. It is restricted to the semi-arid regions bordering the southern Rocky Mountains in the United States and to northern Mexico. According to Riley (1877), the larvae of *Henous* live on grasshopper eggs in the same manner as do their close relatives *Epicauta* and *Macrobasis*.

SYNOPTIC KEY

Upper surface rather finely, approximately punctured, the elytra granulate and finely pilose, the pilosity often concealing the sculpturing to a great extent; the prothorax about as long as broad and with sides slightly arcuate; and the elytra covering fully three-fourths of the abdomen.....**confertus** (Say)

Upper surface of head and prothorax coarsely, not closely punctured, the elytra not evidently punctured but scabrous and very sparsely clothed with fine pile, the general sculpturing not concealed; the prothorax broader than long, almost quadrate; and the elytra in life covering but little more than half of the abdomen .....**parvulus** (Hald.)

## **Henous confertus** (Say)

Plate 15, figure 1

*Meloe confertus* Say, Jour. Acad. Nat. Sci., Phila., vol. 3, p. 281, 1824; LeConte Edit. Say's Complete Works, vol. 3, p. 167, 1859.

*Henous confertus* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 330, 1853; Jour. Acad. Nat. Sci., Phila., vol. 4, p. 38, 1858; Henshaw, List Col. Am., p. 130, 1885; Champion, Biol. Centr.-Amer., Col. Het., vol. 4, (2), p. 368, 1892; Wellman, Canad. Entom., vol. 42, p. 394, 1910; Borchmann, Junk's Col. Cat., Pars 69, p. 118, 1917; Leng, Cat. Col. Am. p. 159, 1920.

*techanus* Haldeman, Stansb. Exped. Great Salt Lake, p. 377, pl. 9, figs. 12–14, 1852.

Biology: Riley, Trans. Acad. St. Louis, vol. 3, p. 556, 1887.

*Type*, lost—

Of moderate size, coal black, subopaque. Head slightly broader than prothorax, subquadrate, occipital area moderately coarsely, approximately punctured, and clothed with short, suberect black pile; eyes large, projecting slightly beyond side margins of head; antennae delicate, reaching about three segments beyond hind angles of prothorax, second segment twice as long as broad, third fully three times as long as broad and equal to two following segments united, outer segments in male somewhat broader and compressed, in female more cylindrical. Prothorax about as broad as long, base conspicuously emarginate, sides posteriorly almost parallel, at anterior third suddenly rounded and narrowed, disk convex, punctured and pubescent in same manner as head, finely caniliculate at middle. Elytra about two-thirds length of abdomen, without humeri, the general shape

elongate fusiform, connate along suture almost to apex, apices very broadly individually rounded, convex, surface finely, closely punctate and granulate, clothed with recumbent, fine, black pile, often dense enough to conceal the sculpturing. Abdomen both above and beneath very finely, moderately closely punctured and somewhat shining. Hind tibial spurs dissimilar, the inner acute, the outer broader and spoon-shaped at apex. Length 9–18 mm., breadth 3.5–7 mm.

This species is very variable as to size and degree of pubescence and slightly as to proportions of prothorax. It is readily separated from *parvulus* by its generally larger size, proportionally longer prothorax and elytra, the denser punctuation, opaqueness, and generally more evident pilosity. The Mexican *H. cardui* Dugès, which is closely allied to it, differs in the main from it according to Champion (1892),

> . . . . by the finer and shallower punctuation of head and thorax, the interspaces between the punctures not being granular; the elytra are also less rugosely punctured; the thorax is less convex; the head has a more or less distinct, smooth, impressed median line extending from the epistoma to the occiput; the third joint of the antennae is not so long as the following two joints united; and the pubescence is brown, with a few intermixed ashy hairs. The male has the elytra contiguous for about two-thirds of its length, and subconnate towards the base; in the same sex of *H. confertus* they are contiguous nearly to the apex, and in some specimens connate throughout.

The biology of this species according to Riley (1887) is very similar to that of the species of *Epicauta*, the larvae feeding on the eggs of grasshoppers.

Say's specimens were from Council Bluffs, Iowa, and from near the Rocky Mountains and Haldeman's specimens from Texas. Say also lists Arkansas and LeConte, as well as Say, Missouri. I have examined specimens from Sioux City, Iowa (Wickham Coll.); Nebraska (Blaisdell Coll.); Belvidere, Kiowa County (W. Knaus), Fort Riley (Chapman Grant), and Sedgwick County, Kansas (Blaisdell Coll.); Vinita, Oklahoma (Wickham Coll.); Fayetteville, Arkansas; and Alvord (C. D. Duncan, Calif. Acad. Sci. Coll.), Lee County (Rev. G. Birckmann), and New Braunsfels, Texas (Wickham Coll.). Champion (1892) reports the Mexican specimens from San Pedro in Coahuila (Palmer).

### **Henous parvulus** (Haldeman)

Plate 15, figure 2

*Meloe parvus* Haldeman, Stansb. Exped. Great Salt Lake, p. 377, 1852; LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 329, 1853.

*Meloe parvulus* Haldeman, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 40, 1853.

*Nomaspis parvulus* LeConte, New Spec. Col., Smith. Misc. Coll., vol. 6, p. 156, 1866.

*Nomaspis parvula* Haldeman, Henshaw, List Col. Am., p. 130, 1885; Wellmann, Can. Entom., vol. 42, p. 394, 1910; Leng, Cat. Col. Am., p. 160, 1920.

*Henous parvulus* Haldeman, Borchmann, Junk's Col. Cat., Pars 69, p. 118.

*Type*[3] *(probably lost)*—

Rather small, black, somewhat shining. Head broader than prothorax, occiput arcuate, posterior angles well rounded, coarsely, umbilicately, and rather sparsely punctured, finely, sparsely pilose; eyes of but moderate size; antennae rather short and robust, reaching not quite two segments beyond hind angles of prothorax, second segment one and a half times as long as broad, third twice as long as broad and about equal to the next two together, the segments 3–11 slightly broader and somewhat compressed in the male. Prothorax subquadrate, broader than long, base slightly emarginate, disk flattened, somewhat depressed near front angles, gibbous near hind angles, punctuation and pubescence similar to that of head, median canilículation fine, well impressed, and complete, somewhat shining. Scutellum punctured and longitudinally impressed at middle. Elytra about two-thirds length of abdomen, connate in basal half, thence gradually divergent and individually rounded at apex, convex, surface scabrous and very finely, sparsely pubescent. Abdomen rather finely, sparsely punctured and pubescent, both above and beneath. Hind tibial spurs about equal and acute. Length, 9–11 mm., breadth 3.5–4 mm.

This species varies slightly as to size and the proportion of the prothorax. It is easily distinguished from the preceding by its smaller size, more shining appearance, more quadrate and flattened prothorax, sparser punctuation of head and pronotum, more divergent elytra with the surface quite scabrous, and the hind tarsal spines equal and similar.

Haldeman's type specimen was collected by Kerns on the "route to Santa Fe." LeConte (1863) lists Kansas and Colorado as additional localities and Leng (1920), Utah. The specimens I have studied are from Flagler, Colorado (Wickham Coll.), McCook, Nebraska (Wickham Coll.), Garden City, Kansas (F. B. Milliken, U. S. Nat. Mus. Coll.), and Cheyenne, Wyoming (H. Stoltan, U. S. Nat. Mus. Coll.).

[3] Mr. Nathan Banks, custodian of the collection of insects in the Museum of Comparative Zoology, Cambridge, Mass., states in a letter dated April 23, 1928, that "*Nomaspis parvula* Hald. is in the LeConte Coll. The first specimen with green label, but there is no indication that it is the type and I do not believe it is the type."

## Genus **Poreospasta** Horn

Plate 15, figures 3, 4

*Poreospasta* Horn, Trans. Am. Entom. Soc., vol. 2, p. 139, 1868; LeConte and Horn, Class. Col. N. Am., Smith. Misc. Coll., vol. 26, p. 416, 1883; Henshaw, List Col. N. Am., p. 130, 1885; Wellman, Can. Entom., vol. 42, p. 394, 1910; Borchmann, Junk's Col. Cat., Pars 69, p. 118, 1917; Leng, Cat. Col. N. Am., p. 159, 1920.

Genotype, *Poreospasta polita Horn*—

*Poreospasta* was established by Horn in 1868 for the reception of *polita*, a peculiar meloid beetle having a superficial resemblance to the species of *Meloe* because of its lack of wings, short elytra, and rather large abdomen, yet differing by having the scutellum distinct and the elytra not imbricated. The description was based upon "several injured specimens from the Southern Coast Range of California, collected by Mr. Wm. M. Gabb." In these the tarsal claws were "unequally cleft, lower portion of each claw very short, scarcely half as long as upper" and this character was given as one of the defining features of the genus. Within recent years I have collected fairly large series of specimens of this species from the Pinoche hills of eastern San Benito County, California, in what might be called the southern part of the inner Coast Range, and have had the opportunity to study other specimens from neighboring regions as well. I have also had in my possession, for purposes of comparison, one of the original paratypes of *Poreospasta polita* Horn, kindly loaned me by the American Entomological Society through Mr. E. T. Cresson, Jr. Many of my specimens were found dead, wind blown, and injured, similar in many regards to the type lot; others were living and perfect when collected. Many of the broken specimens had the tarsal claws much like those studied by Horn, with the lower blade or portion of each claw much shorter than the upper. Others, some of the old and all of the fresh specimens, had the claws completely cleft to the base and the blades of equal length (pl. 15, fig. 4*a*), similar to those of *Meloe* and the more typical winged members of the family. It was thus proved that the portions of the claws were of unequal length through accident; therefore, this character will have to be abandoned. The genus *Poreospasta* is otherwise a good and distinctly defined genus, standing well apart from its fellows. It merely needs to be recharacterized and this I will do. I will also place in the genus the species formerly listed as *Nomaspis sublaevis* Horn. As stated before, this species is

not congeneric with *parvulus* (Hald.), the genotype of *Nomaspis*, and accordingly does not belong in the genus *Henous* Hald. with which *Nomaspis* Lec. has been united, but in the genus *Poreospasta;* for it is not only congeneric with *Poreospasta polita* Horn but specifically very closely related to it. *Henous mexicanus* Dugès, if as closely related to *sublaevis* Horn as stated by Champion (1892), will also have to be placed in the genus. This resemblance, however, I am inclined to believe is more superficial than real.

The genus *Poreospasta* is rather closely related to *Lytta*, in fact might be called a specialized member of the lyttine stock. It is characterized in common with that genus by having antennae with the intermediate segments more or less moniliform; the anterior femora without sericeous patches of hair beneath; the penultimate tarsal segment cylindrical, not bilobed; the tarsal claws cleft to the base, with the two blades of equal length and the upper simple; the scutellum well developed and exposed. In addition it is apterous, with the elytra somewhat abbreviated and not covering much more than the basal portion of the abdomen, and with the sutural margins straight and approximate in fresh specimens (in dried specimens there is often a slight lateral overlapping). The metasternum is short but the mesocoxae do not overlap the metacoxae. From *Meloe*, it differs by having an evident scutellum and the elytra not imbricated. From the South American genus *Pseudomeloe* Fairm. and Germ., which would in general answer to the same characterization, it can be separated by having a more transverse head and prothorax, and the elytra very much larger and approximate along the suture. *Pseudomeloe* has an entirely different facies and has small, divergent elytra as in *Megetra* Lec. The latter are also highly ornamented with brilliant orange red markings. *Poreospasta* is intermediate in position between *Lytta* and *Meloe* and is undoubtedly a genus much later evolved than the latter. The two species from our fauna are restricted to California, being found in the dryer parts of the western San Joaquin Valley and the hills which bound it on the west, and the so-called Mohave Desert, to the south.

## SYNOPTIC KEY

General surface black, somewhat shining, the front of head with arrow-shaped orange spot and generally the side margins of prothorax also orange; prothorax over one-third broader than long, with sides generally subangulate, the disk flattened or often slightly sulcate with lateral angles gibbous; the scutellum impunctate at apex and generally foveate; the abdomen very finely punctured, shallowly rugose and shining..... **polita** Horn

General surface black, subopaque, the front of head and often the hind margin orange, rarely the side margins of prothorax also orange; prothorax at most one-third broader than long, with sides rather evenly arcuate or broadest in front of middle, the disk slightly convex; the scutellum with apex somewhat punctate; the abdomen distinctly punctured and rugose and somewhat subopaque ..... **sublaevis** (Horn)

## **Poreospasta polita** Horn

Plate 15, figure 4

*Poreospasta polita* Horn, Trans. Am. Entom. Soc., vol. 2, p. 139, 1868; Henshaw, List Col. N. Am., p. 130, 1885; Wellman, Can. Entom., vol. 42, p. 394, 1910; Borchmann, Junk's Col. Cat., Pars 69, p. 118, 1917; Leng, Cat. Col. N. Am., p. 159, 1920.

*Type*, Horn Collection, Academy of Natural Sciences, Philadelphia—

Rather large and robust, especially the females, somewhat shining, black, the frontal area of head with an arrow-shaped orange spot, sides of pronotum also generally orange, the latter sometimes so large as to leave but a small black area at the middle of the disk. Head generally slightly broader than prothorax, in a few cases somewhat less in breadth, broadly triangular, the posterior margin almost straight, hind angles evenly rounded and sides moderately convergent forwards and quite straight, the front hardly convex, rather finely, sparsely punctured; eyes slightly reniform and moderately large; antennae reaching slightly beyond hind angles of prothorax, second segment small, third subcylindrical, fully twice as long as broad and not quite equaling two following united, segments 4–6 gradually shorter, 7–10 gradually longer and broader, eleventh slightly longer than third and acuminate. Prothorax fully one-third broader than long, apex slightly emarginate, base faintly arcuate, the sides obliquely divergent from base until near middle then broadly rounded to apex or in extreme forms subangulate; the disk flattened, just perceptibly convex at middle in some species, or in the extreme forms broadly and shallowly sulcate and with the lateral angles elevated or somewhat gibbous, median caniliculation vaguely defined posteriorly, the surface very finely rugose and finely, sparsely punctured, the punctures more evident apically. Scutellum broadly triangular, blunt at apex, shallowly punctate basally and impunctate apically, apex also generally foveate. Elytra about three-fourths length of abdomen, approximate throughout greater extent in fresh specimens (much curled in dried), the surface moderately smooth basally and slightly rugose apically, often with several vague longitudinal crista. The abdomen very finely and sparsely punctured, shallowly rugose and shining. Hind tibial spurs dissimilar, inner acute, outer longer, broader, and spoon-shaped at apex (pl. 15, fig. 4*a*). Length 11–20 mm., average 13 mm., breadth 6–9 mm.

This species is best separated from *sublaevis* (Horn) by the characters given in the key. The males are in general slightly smaller

than the females but the species is very variable as to size and also in regard to the extent of the orange markings on the head and prothorax and the shape of the prothorax.

The type specimens were from the "Southern Coast Range of California," a rather indefinite locality. My specimens were collected in the Pinoche hills of eastern San Benito County, California, April 22, 1922. I have also in my possession one specimen collected by Dr. G. D. Hanna in the Kettleman Hills, Fresno County, March 30, 1926, and a series from near Gorman in the Mohave Desert collected March 20, 1926, by Mr. F. H. Wymore. The latter definite localities would therefore place the area of distribution of this species in the uplands of the western Mohave Desert and the semi-arid hills flanking the western side of the southern part of the San Joaquin Valley.

### **Poreospasta sublaevis** (Horn)

Plate 15, figure 3

*Nomaspis sublaevis* Horn, Trans. Am. Entom. Soc., vol. 2, p. 140, 1868; Henshaw, List Col. Am., p. 130, 1885; Leng, Cat. Col. Am., p. 160, 1920.

*Henous sublaevis* (Horn), Borchmann, Junk's Col. Cat., Pars 69, p. 118, 1917.

*Type*, Horn Collection, Academy of Natural Sciences, Philadelphia—

Rather large and robust, subopaque though moderately smooth, black, the frontal area of head with a broad arrow-shaped orange spot and often the basal area of the head also orange, the side margins of prothorax less rarely orange. Head not broader than prothorax, in the more robust specimens slightly narrower, broadly triangular, with basal margin and sides quite straight in large specimens, slightly arcuate in average-sized forms, hind angles rounded, front slightly convex, finely sparsely punctured, smoother at center; antennae reaching about one segment beyond hind angles of prothorax, second segment small, the following of about the same length as in the preceding species but a bit more robust. Prothorax about one-third broader than long, with base as well as apex slightly emarginate, the sides evenly arcuate, broadest in front of middle but never angulate, the disk slightly convex, caniliculation generally quite evident, sometimes almost complete, the middle of posterior margin often distinctly elevated, surface finely, sparsely punctured and variable from almost smooth to finely rugose. Scutellum generally with punctures at apex as well as base. Elytra similar to those of preceding species but with surface less shining as a result of greater rugosity. The abdomen is also more definitely punctured and subopaque than the preceding. Hind tibial spurs dissimilar, the inner slender and acute, the outer longer and broadly spoon-shaped at apex (pl. 15, fig. 3*a*). Length 11–18 mm., breadth 6–9 mm.

This species superficially resembles the preceding but is in general duller in appearance with head and prothorax less broad and less angulated as a rule, the pronotum never quite so flat as in the other, the scutellum more punctate, the abdomen decidedly less shining, and the outer tibial spur broader. It is also, like the other, very variable as to size, the proportions of head and prothorax, and to a lesser degree the coloration and surface appearance.

The type was from near old Fort Tejon, in the mountains to the south of Bakersfield, California. My own large series of specimens was collected by Miss Ethel Pease, from the school garden at Ducor, Tulare County, California, March 22, 1913, where the beetles were devouring the foliage of the plants. I have also examined a number of specimens in the collection of the California Academy of Sciences, several collected by Mr. Albert Koebele in May in the San Joaquin Valley, and several collected by Dr. G. H. Hanna at Posey Creek, Kern County, April 16, 1927. Judging from the localities given, I would consider this species as more of a lowland one than the preceding, being found in the main on the floor of the southern part of the San Joaquin Valley and like its fellow, a spring species.

## Genus **Meloe** Linnaeus

Plates 16, 18, 19, figures 5, 6, 13–30

*Meloe* Linnaeus, Syst. Nat., ed. 10, p. 419, 1758; LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 328, 1853; Class. Col. Am., Smith. Misc. Coll., vol. 11, p. 269, 1873; LeConte and Horn, Class. Col. Am., Smith. Misc. Coll., vol. 26, p. 416, 1883; Champion, Biol. Centr.-Am., Col., vol. 4 (2), p. 364, 1892; Wickham, Can. Entom., vol. 28, p. 33, 1896; Blatchley, Col. Indiana, p. 1352, 1910; Wellman, Can. Entom., vol. 42, p. 395, 1910; Borchmann, Junk's Col. Cat., Pars 69, p. 119, 1917.
*Proscarabaeus* Stephens, Ill. Brit. Entom., Mand., vol. 5, p. 65, 1832.
*Cnestocera* Thompson, Skan. Col., vol. 6, p. 342, 1864.
*Treiodous* Dugès, La Naturaleza, vol. 1, p. 102, 1870.

Genotype, *Meloe majalis* Linn.—

The genus *Meloe* was established by Linnaeus (1758) with two typical, wingless species, *proscarabaeus* and *majalis*, besides a number of fully winged ones. The winged forms were removed by subsequent workers to become the types of other genera, and *proscarabaeus* was used by Schrank (1781) as the type of a subgenus and by Stephens (1832) (not Leach as stated by Wellman [1910]) to become the type of his genus *Proscarabaeus*. This genus was later suppressed or, if

used at all, used merely as a subgenus. Thus was left *majalis* which becomes, according to the rules as indicated by Wellman (1910), the type of the genus *Meloe*.

The genus is characterized by being wingless in both sexes, with the elytra much shorter than the abdomen and imbricated or laterally overlapping, the scutellum not evident, the metasternum very short with the middle coxae partly covering the hind coxae, and the meso- and metathorax entirely concealed by the elytra; the tarsal claws completely cleft, with the upper and lower portions equal in length and the upper blade nonserrated or pectinated; the frontal suture distinct, the front prolonged before the insertion of the antennae; the antennae of moderate length, more or less moniliform with the intermediate segments in the males of some species much enlarged and distorted; and the anterior femora without sericeous patches.

As thus defined, it agrees with the genus *Lytta* Fabr. except that in the former the wings are absent, the elytra are reduced in length, and the metasternum shortened as a consequence. It is in reality an offshoot of *Lytta*, modified along lines of degeneration, and should be closely associated with that genus as I have previously done.

The species are of moderate size, one to several centimeters in length, with abdomens much enlarged, and are as a rule somewhat uniform in coloration, either black, blue, greenish, or violet. They are to be found on the ground or low herbage and at any time from late fall to the early summer according to the species. The species are in the main Holarctic though they range in the New World into Mexico and in the Old World are to be found in various parts of Africa, even as far south as Cape Colony, and in Madagascar. They are entirely absent from the Oriental and Australian regions. There are according to the latest catalogue (Borchmann, 1917), 132 known species[4] in the world and Leng (1920) lists thirteen as occurring in America north of Mexico and Champion (1892), four as occurring in Mexico, including one which is also found within the United States. The last and only complete review of our species was made by LeConte (1853), since which time many additions have been made. Three new species and one new subspecies are now in my hands. The species found within our territory are best separated by color, the modifications of the antennae, the size and shape of the head and prothorax, the degree of prominence of the eyes, and the sculpturing. Such characters as the posterior tibial claws and the pubescence on the

[4] Several of the species listed by Borchmann have been removed to other genera and several others are not now considered valid.

underside of the tarsi, characters found of some value for the separation of European species, do not vary enough in our species to be of use. The males have the last ventral segment deeply emarginate, the basal segments of the anterior tarsi with a dense yellow pubescence, and, in most of our species, the fifth, sixth, and seventh antennal segments very much enlarged and distorted. Only two of our species have the antennae simple in both sexes. This is just the opposite of what occurs in Europe. The antennae also vary in other regards, particularly as to the length and breadth of the segments, and to a certain degree these characters are reliable. The size, shape, and sculpturing of the prothorax are also quite characteristic of the different species. The sculpturing of the head, elytra, and abdomen is useful though less reliable. Certain species can also be definitely separated by their color but a number may be either absolutely black or with a tinge of violet or green, and thus not so surely defined. Where a species cannot be named with certainty by the table, it should be worked out by the use of the detailed descriptions as well as checked up with the figures. It is a difficult group, for many of the species vary considerably, as is apt to be the case with all parasitic insects. Some of the depauperized individuals may have the shape of the prothorax as well as the general sculpturing quite different from typical or fully formed specimens. In such cases the distributional or seasonal appearance may give the proper clue.

The complete biology of none of our species has been worked out though they are probably, like their European relatives, parasitic in bees' nests. Some of our species seem to be late autumn forms, others strictly vernal or early summer. In a few cases they are gregarious, e.g., *strigulosus* Mann. and *americanus* Leach, and at times they are fairly common, but most are to be found only one at a time, or two or three in a limited locality.

## SYNOPTIC KEY

1. Fifth to seventh antennal segments dilated and distorted in the male, stouter than the following segments in the female. (Subgenus *Proscarabaeus* Schrank (1781), Genus *Proscarabaeus* Stephens (1832), Genus *Cnestocera* Thompson (1859) ..... 2

   Fifth to seventh antennal segments at most somewhat enlarged in the male, no stouter—or but little, than the following segments in the female, the eighth and ninth not twice as long as broad. (*Meloe* sens. str.) ..... 16

2. Prothorax fully as long as broad or longer than broad and with sides more or less sinuate ..... 3

   Prothorax as broad as long, or broader than long, with sides straight, simply arcuate or but slightly sinuate at most ..... 9

3. Eyes prominent, projecting beyond side margin of head, punctuation of head and prothorax fine and rather sparse ..... 4
   Eyes less prominent, not evidently projecting beyond side margin of head, punctuation of head and prothorax coarse and somewhat dense in places ..... 7
4. Color violet or with a bluish or greenish tinge ..... 5
   Color black ..... 6
5. Prothorax evidently elongate, color always pronounced, and punctuation always fine ..... **americanus** Leach
   Prothorax often somewhat short, color deeper, sometimes almost black, punctuation generally coarser ..... subsp. **occidentalis** subsp. nov.
6. Eighth and ninth antennal segments fully twice as long as broad, a greasy black or with the faintest tinge of violet, elytra obscurely strigulose ..... **moerens** Lec.
   Eighth and ninth antennal segments not twice as long as broad, coal black without trace of violet, elytra sharply strigulose ..... **strigulosus** Mann.
7. Violet, blue or greenish in color ..... 8
   Coal black, disk of prothorax irregular, deeply sulcate at middle posteriorly and punctuation sparser toward center, elytra with strigulae not sharply defined ..... **californicus** sp. nov.
8. Color a deep violet or blue, pronotum irregular and with irregular and coarse punctures, elytra coarsely strigulose ..... **angusticollis** Say
   Color a greenish violet, pronotum more regular and with punctuation less coarse and more evenly distributed, often with short setae arising from punctures, elytra finely yet sharply strigulose ..... **perplexus** Lec.
9. Color violet blue, or somewhat greenish ..... 10
   Color black ..... 13
10. Prothorax rather evidently narrowed behind ..... 11
    Prothorax hardly narrowed behind, sides almost parallel, disk flat and very coarsely irregularly punctured ..... **quadricollis** sp. nov.
11. Elytra not coarsely strigulose, punctures of head and prothorax but moderately coarse ..... 12
    Elytra very coarsely strigulose, punctures of head and prothorax very coarse ..... **montanus** Lec.
12. Prothorax small, narrowed much before apex and much narrowed basally ..... **tinctus** Lec.
    Prothorax large, narrowed apically and but slightly narrowed basally ..... **impressus** Kirby
13. Somewhat opaque, pronotum slightly convex, ovoid, disk rather even and with punctuation but moderately coarse and rather regularly placed ..... 14
    Moderately shining, pronotum distinctly flattened, surface uneven with punctures coarse, numerous, and irregularly disposed, elytra coarsely strigulose ..... **franciscanus** sp. nov.
14. Outer antennal segments distinctly longer than broad, prothorax barely broader than long, abdomen rugose without evident punctuation ..... 15
    Eighth and ninth antennal segments hardly longer than broad, prothorax broad, abdomen finely rugose with evident punctuation ..... **opacus** Lec.
15. Larger species, antennae much longer than head and prothorax, punctuation of head and prothorax shallow, prothorax somewhat elongate ..... **carbonaceus** Lec.
    Smaller species, antennal segments hardly longer than head and prothorax, punctuation coarse and deep, prothorax not elongate ..... **afer** Bland

16. Fifth to seventh antennal segments somewhat enlarged in males, in neither sex less broad than following, pronotum quadrate, disk flattened, broadly sulcate basally and coarsely and rather regularly punctured....**barbarus** Lec.
Fifth to seventh antennal segments not evidently enlarged in males, the terminal segments in both sexes broader than intermediate, pronotum narrowed basally, very finely and sparsely punctured.....**laevis** Leach

## **Meloe americanus** Leach

Plate 18, figure 13

**Meloe americanus** Leach, Trans. Linn. Soc. London, vol. 11, pp. 250–251, pl. 18, figs. 5, 6, 1813; LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, pp. 328, 329, 1853; Baudi, Deutsche Entom. Zeitsch., vol. 22, p. 352, 1878; Wickham, Can. Entom., vol. 28, p. 33, 1876; Blatchley, Col. Indiana, p. 1352, 1910.

*Type* in British Museum—

Moderately large, violet or deep bluish black, shining. Head subquadrate, breadth slightly greater than from vertex to base of clypeus, considerably broader than prothorax, occiput evenly and slightly arcuate, hind angles well rounded, sides slightly arcuate, front flattened, surface dull, alutaceous, sparsely and finely punctured; antennae rather long and delicate, extending several segments beyond hind angles of prothorax, first segment robust and rather suddenly clavate, second small, slightly longer than broad, third as long as two preceding, fourth three-fourths length of third; eyes large and prominent. Prothorax usually distinctly longer than broad, broadest one-third distance from apex, sides rounded in front, slightly sinuate and convergent toward base, base slightly emarginate; disk barely convex, surface dull and alutaceous, sparsely and finely punctured, generally with a slight median longitudinal impression and several shallow lateral ones. Elytra moderately long, and finely though conspicuously strigulose. Abdomen above with plates broad and extending full length of segments, finely irregular strigulose; beneath, rather coarsely, closely punctured and somewhat strigose. Length to end of elytra, 12–18 mm., breadth 6–10 mm.

Male. Fifth to seventh antennal segments enlarged and distorted, arranged in a semicircle, fifth slightly longer along inner edge than fourth, trumpet-shaped and obliquely truncate at apex, sixth as long as fourth, as broad as long, compressed and concave on front face, seventh slightly shorter and narrower than preceding, somewhat curved and concave on anterior face, eighth to eleventh cylindrical, eighth about twice as long as broad, ninth and tenth gradually longer and narrower, the eleventh one and a half times as long as tenth and acuminate.

Female. Fifth antennal segment similar in length and shape to fourth, sixth slightly broader and of same length, seventh to tenth cylindrical, gradually shorter and narrowed, the eleventh as in male.

The typical *americanus* is the commonest species of eastern North America and is at times gregarious and very numerous. Its moderate size, violet or bluish black color, elongate prothorax, and very fine and sparse punctuation should enable it to be readily identified. *M. angusticollis* Say, which in the past has often been confused with it, is of a deeper violet color, with prothorax generally more elongate, a very coarse punctuation of both head and prothorax, and the elytra more coarsely strigulose. It is generally much rarer. *M. moerens* Lec., a much closer relative, is coal black or at most with a faint violet tinge to legs, with pronotum more deeply and irregularly impressed, more coarsely punctured and with the elytra more punctate-rugose and less strigulose.

I have seen specimens from numerous localities ranging from eastern Canada to Florida (Seven Oaks); from Arkansas, Iowa, and North Dakota, as well as from Quebec, Ontario, Manitoba (Aweme), Saskatchewan (Saskatoon), and Alberta (Olds). It is listed by Blatchley (1910) as uncommon in southern Indiana. It varies considerably as to the proportions of the prothorax, in the more typical being distinctly longer than broad, in others about as broad as long. It also varies somewhat as to the intensity of coloration and degree of smoothness, and, as is the case with all the species, it varies greatly as to size. In the Rocky Mountain regions in Colorado, Wyoming, Idaho, northeastern Oregon, and western Alberta, there is a phase which at times is almost black, much more opaque, and with coarser punctuation than is to be found in the more eastern form. This is so distinct that I think it merits a name so I am describing it as a new subspecies. Intermediates link it up with the typical form.

**Meloe americanus occidentalis** Van Dyke, n.ssp.

Plate 18, figure 14

*Type,* United States National Museum, Washington, D.C.—

Similar in size and general proportions to the typical form but differing by being black or with but a slight tinge of blue; the head and prothorax duller and more granular, less sericeous and shining, with the punctuation distinctly coarser and as a rule more abundant.

*Holotype,* a male collected at Fort Sherman, Idaho, in August by J. C. Merrill (U. S. Nat. Mus.). *Paratypes,* male and female, from Idaho, August 20 and 27, 1897, collected by C. V. Piper (U. S. Nat. Mus.), the female somewhat larger and darker; a pair from Animas River, Durango, Colorado, July 19, 1908 (Hopping Coll.); and six

specimens in the Wickham collection: a female from South Park, Colorado, August, 1925 (E. J. Oslar Coll.), a female from Swan Lake Valley, Wyoming, September, a male and female from Laramie, Wyoming, a male from Florence, Colorado, August (Wickham Coll.), and a female from Breckenridge, Colorado, July 15–18, 1896 (Wickham Coll.). Besides these I have seen four smaller and less typical specimens: Summit County, Colorado (Coll. T. D. A. Cockerell), Big Horn Mountain, Wyoming, July 18, 1896, and Wallowa Mountains, Baker County, Oregon, July 6, 1922, collected by E. C. Van Dyke. All of these last mentioned except the last are in the U. S. National Museum. A fairly typical specimen from Banff, Alberta, July 18, 1924 (Coll. Eric Hearle), is in the Hopping collection. This subspecies occupies the most westerly portion of the territory in which *americanus* is to be found and is in a way a mountain and depauperized form.

### **Meloe moerens** LeConte

Plate 18, figure 15

*Meloe moerens* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 328, 1853.

*Type,* LeConte Collection, Museum Comparative Zoology, Cambridge, Mass.—

Rather large, black, with at most a slight purplish luster, dull. Head subquadrate, breadth about one-fourth greater than from vertex to base of clypeus, occiput transverse, faintly notched at middle, hind angles well rounded, sides faintly arcuate; front flattened, a shallow impression above each antennae, surface subsericeous, finely, sparsely punctured, median area often impunctate; antennae long and slender, extending several segments beyond hind angles of prothorax, first segment robust and gradually clavate, second small, third about as long as first, fourth somewhat shorter; eyes moderately prominent and convex. Prothorax longer than broad, broadest one-third distance from apex, base angularly emarginate, sides oblique in front and rounded at point of greatest breadth, thence oblique and slightly sinuate to hind angles which are slightly everted; disk slightly convex, median canilieulation finely impressed and almost complete, surface dull, irregular, slightly impressed laterally both in front and behind, and rather finely, sparsely punctured, more abundantly near base and apex. Elytra normally twice as long as head and prothorax, rather finely, inconspicuously punctured, moderately rugose and longitudinally strigulose. Abdomen above with plates large both transversely and longitudinally, and distinctly, finely, and irregularly strigulose; beneath, rather finely, sparsely punctured, hind margins of segments 1–4 more closely punctured and somewhat strigose, fifth segment more closely punctured, rugose and strigulose. Length to end of elytra 16 mm., breadth 9 mm.

Male. Fifth to seventh segments enlarged and distorted, arranged in a semicircle, fifth as long as fourth, longer than broad, funnel-shaped and obliquely truncate at apex, compressed and slightly concave anteriorly, seventh a bit shorter, irregularly wedge-shaped and compressed especially basally, eighth, ninth, and tenth cylindrical, gradually longer and narrower, the eleventh fully one-third longer than tenth and acuminate.

Female. Fifth and sixth antennal segments cylindrical and about equal to fourth, seventh and eighth similar but shorter, ninth and tenth gradually longer and narrower, the eleventh one-fourth longer than tenth and in general similar to same segment in male.

This species belongs near *americanus* Leach but differs in color, in the more evident and irregular way in which the disk of the pronotum is impressed, the slightly coarser punctuation, more abundant anteriorly and posteriorly on the pronotum, the less rugose condition of abdomen underneath, and to a slight extent in the proporations of the antennal segments.

The type was from New York. I have seen other specimens from Pennsylvania, Plummers Island, Maryland, June 13, 1905 (E. A. Schwartz Coll., U. S. Nat. Mus.), Black Mountains, North Carolina, May 25, 1912 (W. Beutenmueller, Van Dyke Coll.), and a somewhat questionable male from Dallas, Texas (U. S. Nat. Mus.). It is apparently a rare species.

### **Meloe strigulosus** Mannerheim

Plate 16, figures 5, 6

*Meloe strigulosus* Mann., Bull. Mosc., vol. 25, p. 349, 1852.

Large, robust, black, slightly shining especially elytra and abdomen. Head broad, over 1 mm. broader than length from vertex to base of clypeus, 5 mm. broader than prothorax, occiput evenly and definitely arcuate, hind angles well rounded, sides slightly convex, front somewhat flattened, surface dull black, finely, sparsely, and irregularly punctured; antennae robust, projecting about two segments at most beyond hind margin of prothorax, first segment very robust, second small, slightly longer than broad, third about one and a half times as long as broad, and fourth about equal in length to second but broader; eyes quite convex and moderately prominent. Prothorax generally slightly longer than broad though often only as long as broad, base rather deeply emarginate, sides broadly rounded back of apex where prothorax is broadest, thence sinuate to rounded hind angles; disk slightly convex with median caniliculation generally quite evident, at least anteriorly and posteriorly, and posterior lateral depressions faintly impressed, the surface dull like head and finely, sparsely, and irregularly punctured, punctures most numerous at sides and front. Elytra not twice as long as head and prothorax,

moderately finely though definitely and rather regularly strigulose. Abdomen above with plates very large, extending full length of segments and very distinctly and rather finely rugulose; beneath, rather finely rugulose and punctate, the hind margins of segments somewhat strigose. Length to end of elytra 10–18 mm., breadth 6–9 mm.

MALE. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, the fifth as long as third, as broad as long, somewhat irregular in outline though obliquely truncate on inner side at apex, sixth longer, much broader than long, compressed and oblique at apex, seventh about as long as preceding, very broadly elliptical and compressed, following segments somewhat cylindrical, eighth slightly longer than broad, ninth a bit longer, tenth about twice as long as broad, and eleventh somewhat over three times as long as broad and pointed apically.

FEMALE. Fifth segment one and a half times as long as broad, sixth about twice as long as broad, seventh equal in length to fifth, the following similar to those of male.

This is probably the commonest and most widely distributed species to be found on the Pacific Coast. Its large size, smooth and finely, sparsely punctured head and prothorax, should enable it to be readily separated from all except *laevis*, and from this it can generally be easily distinguished by its more elongate and laterally sinuated prothorax, with the base more deeply emarginate, the elytra more coarsely strigulose, the dorsal sclerites of the abdomen larger and more coarsely rugulose, and the median segments of the male antennae enlarged and distorted.

I have examined a very large series of these and from the following localities: Quanichan Lake, Vancouver Island, December, 1892 (Wickham Coll.); Seattle, Washington (Van Dyke Coll.); Salem, Oregon, February 4 and October 29, 1905 (Wickham Coll.), and Hood River, Oregon (Hubbard and Schwarz Coll., U. S. Nat. Mus.); Trinity County, California, November 20, 1918, December 9, 1918, 29 specimens, January 8, 1919, 17 specimens, November 11, 1919, 32 specimens, and January 7, 1920, 4 specimens (C. R. Leach Coll.); Sobre Vista, Sonoma County, March 26, 1911 (Kusche Coll. in Van Dyke Coll.), Lagunitas, Marin County (J. O. Martin and H. Dietrich); Livermore, Alameda County, February 22, 1909 (Kusche Coll. in Van Dyke Coll.), and Alameda County (U. S. Nat. Mus.); Mendocino County, May 2, 1919 (C. R. Leach Coll.), Poway, San Diego County (F. E. Blaisdell Coll.), and Arizona (F. E. Blaisdell Coll.). Mr. H. C. Fall also records it from Palm Springs, Riverside County, California. As shown from these records it is a species of late fall and early spring. Mr. C. R. Leach found it gregarious in Trinity County,

and Mr. J. O. Martin and Mr. Henry Dietrich found it gregarious at Taylorville, Marin County, California. Professor Trevor Kincaid also reports it as having been found by the hundreds about Olympia, Washington.

### **Meloe californicus** Van Dyke, n.sp.

Plate 18, figure 16

*Type,* California Academy of Sciences, San Francisco, California—

Rather large, somewhat elongate, coal black, and slightly shining. Head of moderate breadth, transverse diameter barely greater than from vertex to base of clypeus (4 mm.) and just perceptibly broader than prothorax, occiput well rounded laterally, moderately flattened at middle and with vague median notch, coarsely and moderately closely punctured, especially posteriorly, less closely on front; antennae moderately robust, longer than head and prothorax combined by at least two segments, first segment robust, gradually enlarged, second small, barely longer than broad, third twice as long as broad, and fourth shorter than preceding but one-third longer than broad; eyes slightly convex though moderately large. Prothorax barely broader than long (3.5 mm. × 3.25 mm.), greatest breadth one-fourth distance from apex, apex two-thirds breadth of this, base evidently emarginate, sides well rounded anteriorly, narrowed and sinuate posteriorly; the disk flattened, slightly depressed basally, with median canilieulation faintly indicated, surface irregular and rather coarsely, not closely punctured, more irregular and sparser at middle. Elytra twice as long as head and prothorax combined, covering about one-half of abdomen, narrowly overlapping anteriorly and with rugosities considerably planed down. Abdomen above with plates broad and extending full length of segments and finely, distinctly rugose, punctuation vague; beneath, rather finely, closely punctured, fine hairs arising from each puncture. Length to end of elytra 14 mm., breadth 8 mm.

Male. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, the fifth but little longer than the fourth and almost as broad as long, obliquely truncate at apex, sixth somewhat shorter, broader than long, compressed, with anterior face slightly excavated and smooth, seventh narrower, wedge-shaped, with anterior face slightly excavated and smooth, the following segments smaller and cylindrical, eighth but little longer than broad, ninth about one-fourth longer than broad, tenth not quite twice as long as broad, and eleventh almost three times as long as broad and pointed apically.

Female. Fifth antennal segment slightly longer and broader than fourth, sixth and seventh of about equal length and shorter than preceding, eighth, ninth, and tenth gradually longer, the tenth about one and one-half times as long as broad, and the eleventh about three times as long as broad and pointed at apex.

This species because of its rather flat pronotum and somewhat shining appearance suggests *franciscanus* n. sp. to a slight extent. It

is, however, a more elongate and narrower insect, with prothorax much narrower proportionally, and it appears about two months later in the season than does the other. It is readily separated from *strigulosus* Mann., which it simulates in general facies, by its coarser type of punctuation. From *carbonaceus* Lec., it differs in the main by the shape and sculpturing of the prothorax, the latter having the sides of prothorax slightly arcuate posteriorly and the disk convex and more regularly and closely punctured. *M. opacus* Lec. is more opaque, with the punctures of head and prothorax much finer and more numerous, the prothorax broader and with the sides posteriorly arcuate, the pronotum more convex and regular, the eighth and ninth antennal segments shorter and the puncturation of the abdomen very evident. *M. afer* Bland. is in general much smaller, more opaque, with the eighth antennal segment shorter, and the prothorax shorter and more oviform as well as more closely punctured.

*Holotype* male and *allotype* female in my collection (Nos. 2539, 2540, Mus. Calif. Acad. Sci.) collected at Los Angeles, California, in April. Besides these, there are before me two males and two females taken by myself at San Francisco, California, April 26 and 28, 1903, and March 29, 1907; a female from Palm Springs, Riverside County, California, April 1, 1916 (C. L. Fox Coll. in Mus. Calif. Acad. Sci.), a male from Oregon (Mus. Comp. Zool., Cambridge, Mass.), and a male and female from the state of Washington (C. V. Riley, U. S. Nat. Mus.), all of which I have designated as paratypes.

This is truly a vernal species, found in the field when the flowering annuals of spring are in full bloom.

### **Meloe angusticollis** Say

Plate 18, figure 17

*Meloe angusticollis* Say, Jour. Acad. Nat. Sci., Phila., vol. 3, p. 280, 1823; Horn, Col. of Canada by Wickham, Can. Entom., vol. 28, p. 33, 1896; Blatchley, Col. of Indiana, Bull. 1, Ind. Dept. Geol. and N. R., p. 1353, 1910.

*Meloe rugipennis* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 328, 1853.

*Type* of *Meloe angusticollis* Say lost, a specimen supposedly compared with type in Harris Collection, Boston Museum.

*Type* of *Meloe rugipennis* LeConte in LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Large, robust, a deep violet color. Head broad, transverse diameter distinctly greater than from vertex to base of clypeus and one-fourth broader than prothorax, slightly convex; occiput arcuate from side to side, quite flattened above, slightly notched at middle, coarsely, deeply, and rather closely punctured especially at sides and posteriorly, an impunctate area near frontal suture; antennae several segments longer than head and prothorax combined, first segment robust, greatly dilated apically, second segment small, one-third longer than broad, third segment more than twice as long as broad, and fourth about twice as long as broad; eyes of moderate size and but slightly convex. Prothorax always distinctly longer than broad, greatest breadth one-third distance from apex, apex two-thirds this breadth, base distinctly emarginate, sides arcuate and convergent at anterior third, oblique, convergent and slightly sinuate posteriorly, the disk slightly convex, almost flat, distinctly depressed at base, and coarsely, irregularly punctured, an elongate impunctate area generally present at center and on either side. Elytra nearly twice as long as head and prothorax combined and in most cases covering one-half of abdomen, broadly overlapping anteriorly, coarsely strigulose. Abdomen above with plates very broad and extending full length of segments and distinctly strigulose, lateral membrane an opaque black; beneath, punctate rugose and sparsely pilose. Length from vertex to apices of elytra 8–15 mm., breadth 3–8 mm.

Male. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, the fifth about one-fourth longer than fourth, broad and with apical truncation slightly oblique, sixth as long as fourth, almost as broad as long, compressed, excavated and smooth on anterior face, seventh somewhat shorter and narrower, wedge-shaped, smooth on anterior face, the following segments considerably smaller than preceding and cylindrical, eighth a fourth longer than broad, ninth slightly longer, tenth about twice as long as broad, and eleventh about four times as long as broad and pointed apically.

Female. Fifth antennal segment just perceptibly longer than fourth, sixth and seventh gradually shorter but of same breadth, the following narrower and more cylindrical, eighth a fourth longer than broad, ninth slightly longer, tenth about twice as long as broad, and eleventh almost four times as long as broad and pointed apically.

This splendid species was for a long time confused with the more common *americanus*. It can always be separated, however, by its deeper violet color, much coarser and apparently more numerous punctuation of head and prothorax, the punctuation of the latter always very fine, and the much coarser sculpturing of the elytra. While the proportionate length of the prothorax, as compared with the breadth, is in general greater in *angusticollis* than it is in *americanus*, it is a variable character which cannot always be relied upon. LeConte's statement that the thorax is nearly one-half longer than wide is not correct for the greater number of specimens—in none of those that I have measured—and Say's statement that the head and

thorax of *angusticollis* are "strikingly narrower than the body" when used in contrast to the other is of little value, at least with dead specimens. This species structurally belongs with *californicus* n.sp., *moerens* Lec., and *americanus* Leach, resembling the last in color, but the coarse punctuation of head and pronotum places it closer to *californicus,* from which it differs not only in coloration but in having the elytra much more coarsely strigulose. From *montanus* Lec., a northwestern species which is likewise of a deep violet or blue color, it can be separated readily by its narrower head, narrower and more elongate prothorax, and more irregular pronotum with irregular punctuation, and usually more depressed base to pronotum.

The type of Say's species was from Pennsylvania and LeConte's *rugipennis,* an undoubted synonym as pronounced by LeConte himself, from the Middle States. Say stated that it was "rare" and LeConte, "not rare." According to later collectors, it might be said to be found occasionally in the northeastern part of the country and adjacent parts of Canada and to be more common in the northern part of its range. Besides the type of *rugipennis* and the specimens in the Harris collection said to have been compared with Say's type, I have critically examined specimens from the following localities: a female from Truro, Nova Scotia (Wickham Coll.), two males and a female from Cumberland County, Maine (Van Dyke Coll.), a female from New York (Wickham Coll.), a male from Washington, D. C. (Hubbard and Schwarz Coll., U. S. Nat. Mus.), a male from Detroit, Michigan (Hubbard and Schwarz Coll., U. S. Nat. Mus.), and a male from Craymoor, Wisconsin (C. W. Hooker Coll., U. S. Nat. Mus.). Besides these I have noted a male and female belonging to the Museum of Comparative Zoology at Cambridge, Massachusetts, which are almost black, the first without locality, the second from New Hampshire. Some of these specimens were taken in late April, May, or June.

### **Meloe perplexus** LeConte

Plate 18, figure 18

*Meloe perplexus* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 329, 1853.

*Type,* a male in the LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Moderately large, greenish black, head and prothorax subopaque, elytra and abdomen more shining. Head moderately broad, transverse diameter about equal to distance from vertex to base of clypeus and one-seventh broader than prothorax, slightly convex; occiput

flattened at middle and arcuate at sides, distinctly, densely, and but moderately coarsely punctured, more sparsely in center of front; antennae slightly longer than head and prothorax united, first segment robust, gradually enlarged, second small yet longer than broad, third over twice as long as broad and fourth one-third longer than broad; eyes of moderate size and but slightly convex. Prothorax as long or slightly longer than broad, greatest breadth one-third distance from apex, apex about two-thirds this breadth, base but slightly emarginate, sides evenly arcuate at anterior third, oblique, convergent and sinuate posteriorly; disk but slightly convex, uneven, flattened posteriorly, with transverse impression near base and posterior margin elevated puncturation rather dense anteriorly, sparser and more irregular posteriorly. Elytra over one-third longer than head and prothorax combined, narrowly overlapping anteriorly, covering much less than one-half of abdomen and rather finely but distinctly rugose. Abdomen above with plates broad and long and very finely and distinctly strigulose, the membrane at sides an opaque black; beneath, finely punctured, obscurely strigose, and with fine hairs arising from each puncture. Length to end of elytra 13 mm., breadth 9 mm.

MALE. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, the fifth broader than preceding segment, one-fourth longer than fourth, and obliquely truncate at apex, sixth as long as fourth, broader than long, compressed, excavated and smooth on anterior face, seventh somewhat shorter and narrower, wedge-shaped, excavated and smooth on anterior face, the following segments considerably smaller than preceding and cylindrical, eighth a fourth longer than broad, ninth somewhat longer, tenth about twice as long as broad, and eleventh three times as long as broad and pointed apically.

FEMALE. Fifth antennal segment perceptibly longer than fourth, the sixth and seventh about equal in length to fourth but stouter, the remainder narrower, eighth but little longer than broad, ninth still longer, tenth almost twice as long as broad, and eleventh almost four times as long as broad and pointed apically.

This species is in a way transitional between those having an elongate prothorax and those which have the broad and more rounded type of prothorax. It approaches *impressus* Kirby but is in general more elongate, with the antennae longer, the outer segments distinctly longer, the prothorax longer, campanulate, not ovoid, flatter, with discal impression not longitudinal but transverse and near basal margin, and the base scarcely emarginate. The abdomen is much more distinctly rugose and the general color always of a greenish black with no tendency to become black as in the other. The type of prothorax is very much that of *americanus* and its associates but the sculpturing that of *impressus*.

Besides the LeConte type at Cambridge and the Horn specimens in the Philadelphia Academy, I have critically studied specimens from

the following localities: a male collected as it was eating buttercups at North Salem, Indiana, October 25 (F. B. Hopkins, U. S. Nat. Mus.), a male and two females from Mount Airy, Philadelphia, Pennsylvania, October 20 (Philip Laurent, Van Dyke Coll.), and an atypical female from Maryland (C. V. Riley, U. S. Nat. Mus.). It seems to be confined to the Middle States of eastern North America, and to be an autumnal species. This fact should aid in its separation.

**Meloe quadricollis** Van Dyke, n.sp.

Plate 18, figure 19

*Type*, California Academy of Sciences, San Francisco, California.—

Fairly large, robust, somewhat shining, black with a distinct bluish tinge. Head not broad, transverse diameter less than from vertex to apex of clypeus and but slightly greater than breadth of prothorax, occiput arcuate from side to side, not flattened at middle and without notch, coarsely, irregularly punctured, more densely posteriorly, the front with numerous irregular impunctate spaces; antennae short, just equaling length of head and prothorax combined, first segment robust, second small, as broad as long, third twice as long as broad, fourth one-fourth longer than broad, fifth just perceptibly broader and longer, sixth and seventh gradually narrower and shorter, eighth as broad as long, ninth and tenth gradually broader and longer, and eleventh less than three times as long as broad and pointed at apex; eyes of moderate size and slightly convex. Prothorax slightly broader than long, 3.5 mm. × 3.25 mm., greatest breadth one fourth distance from apex, apex one-half this breadth, base evidently emarginate, sides arcuate from anterior fourth to apex, almost straight and parallel posteriorly and with a slightly rounding in at base; the disk quite flat, with median longitudinal line indicated as a fine line at middle, and coarsely, irregularly and somewhat confluently punctured, the general surface quite uneven. Elytra one-third longer than head and prothorax combined and covering about one-half of abdomen, narrowly overlapping anteriorly and moderately coarsely rugose. Abdomen above with plates broad and extending full length of segments and distinctly and finely strigulose; beneath, punctate rugose. Length to end of elytra 13 mm., breadth 8 mm.

*Holotype* (No. 2541, Mus. Calif. Acad. Sci.), a unique female captured at Livermore, California, February 22, 1909, by Mr. J. August Kusche and by him kindly presented to me.

This species, the only one from California which has even the suggestion of a bright color, bears a slight resemblance to *impressus* Kirby, but it is in general more robust, has a narrower head, shorter antennae, flatter, more quadrate and more coarsely punctured prothorax, as well as more coarsely strigose elytra and abdomen. Its very

distinctly flattened and quadrate pronotum is only duplicated among our species in *barbarus* Lec. and these characters as well as the color should readily separate it from our other species. *M. opacus* Lec. is not only a sooty black but also has the punctuation of head and prothorax much finer, the prothorax slightly convex above, and the sides distinctly convergent posteriorly. Some specimens of *carbonaceus* Lec. approach it as regards the coarseness of the punctures of head and prothorax but the shape of the prothorax is different and the outer segments of the antennae much longer. *M. franciscanus* n.sp., because of the coarseness of punctuation and the flatness of the prothorax, might possibly be confused with this but it is in general a much more robust species, with more transverse and quadrate head, heavier antennae, and a narrower prothorax as well as a different color. *M. californicus* n.sp., which also has quite coarse punctures, has a much more elongate prothorax, smoother elytra, and is in general much narrower and more elongate. It also occurs much later in the season.

### **Meloe montanus** LeConte

Plate 18, figure 20

*Meloe montanus* LeConte, Smith. Misc. Coll., vol. 6, p. 155, 1866.

*Type*, LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Large, robust, a deep violet or bluish black color. Head broad, transverse diameter greater than from vertex to base of clypeus and one-fifth broader than prothorax, slightly convex, occiput arcuate somewhat flattened at middle and notched. Coarsely, deeply, and rather closely punctured, especially at sides and posteriorly; antennae longer than head and prothorax combined, first segment gradually enlarged apically, second small and transverse, third twice as long as broad, fourth one-third longer than broad; eyes of moderate size and barely convex. Prothorax typically broader than long though often of equal dimensions, greatest breadth one-third distance from apex, apex one-half this breadth, base evidently emarginate, sides evenly arcuate at anterior third and convergent to apex. Almost straight and slightly convergent posteriorly; the disk moderately convex and coarsely, rather closely irregularly punctured, impunctate areas generally present at center and on either side. Elytra one-third longer than head and prothorax combined and in most specimens covering greater part of abdomen, broadly overlapping anteriorly, and coarsely strigulose. Abdomen above with plates broad and extending full length of segments and finely but not markedly strigulose; beneath, somewhat hairy and regularly punctured. Length to apex of elytra 12–20 mm., breadth 7–9 mm.

MALE. Fifth to seventh antennal segments greatly enlarged and distorted, semicircularly arranged, the fifth considerably longer and broader than fourth and with outer apical area smooth and rounded, the sixth as long as fourth, as broad as long, transversely compressed, obliquely excavated anteriorly and smooth, the seventh shorter and narrower, transversely compressed and with inner surface smooth, somewhat excavated, the eighth short, as broad as long, the ninth and tenth of same breadth but gradually longer, the eleventh almost three times as long as broad and pointed at apex.

FEMALE. Outer antennal segments less robust than in male, the fifth slightly shorter and narrower than fourth, sixth and seventh gradually diminishing in size, the remainder of equal width but narrower than seventh, eighth slightly longer than broad, ninth longer, tenth still more so, being about twice as long as broad, and eleventh almost four times as long as broad and pointed apically.

Typical specimens of this large and robust species could be confused only with *angusticollis* Say. The latter is more brilliant, with both head and prothorax generally much narrower, the frontal punctures much more irregular as to size and arrangement, and the eighth antennal segment in both sexes always distinctly longer than broad. The distribution is also quite diffeernt. *M. impressus* Kirby, which might possibly invade its territory, is much more finely punctured on head and prothorax, has much less markedly strigulose elytra, and is more greenish in color. *M. tinctus* Lec. is a much smaller species with the head more evenly punctate and more densely so anteriorly, the prothorax always much narrower than the head, the disk more regularly and densely punctured and slightly caniliculate posteriorly, and the elytra much more finely strigulose. The darker phases of *montanus* are often very hard to separate from *carbonaceus* Lec. as will be brought out in the discussion of that species.

This species was described from a Montana specimen but it ranges west into Washington and British Columbia. Besides the type, I have carefully examined one small male from eastern Washington (C. V. Piper, U. S. Nat. Mus.), one male and female from Victoria and a female from Vernon, British Columbia (Coll. H. F. Wickham), two males and two females labeled Seattle and presented to me many years ago by my good friend, the late Professor O. B. Johnson of Seattle, and the following specimens submitted by Mr. Ralph Hopping: a male and female from Chilcotin, British Columbia, May 23, 1921, and April 26, 1920 (E. R. Buckell), a female from Pentictos, British Columbia, April 25, 1919 (E. R. Buckell), a male and female from Midday Valley, British Columbia, May 21, 1921, and May 24, 1922

(the first collected by Hopping, the latter by N. L. Cuttler), a female from Vernon, British Columbia, June 17, 1923 (R. Hopping), a female from Creston, British Columbia, May 20, 1923 (C. S. Lallamand), and two males and a female from Mara, British Columbia, May 22, 1921 (H. Blurton).

### **Meloe tinctus** LeConte

Plate 18, figure 21

*Meloe tinctus* LeConte, Smith. Misc. Coll., vol. 6, p. 155, 1866.

*Type*, LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Small, rather delicate, nigro-violaceus. Head broad, transverse diameter greater than vertex to base of clypeus and almost two-fifths broader than prothorax, slightly convex, occiput distinctly arcuate, coarsely, deeply, rather closely, and quite regularly punctured; antennae slightly longer than head and prothorax combined, first segment robust, gradually enlarged apically, second small though a fourth longer than broad, third larger, twice as long as broad, and fourth one-third longer than broad; eyes rather large and slightly convex. Prothorax barely broader than long, greatest breadth one-third distance from apex, apex more than one-half this breadth, base evidently emarginate, sides evenly arcuate at anterior third, oblique, convergent and slightly sinuate posteriorly, the disk distinctly convex, caniliculate at middle posteriorly, the basal margin depressed, coarsely, moderately closely, and regularly punctured, impunctate areas not very evident. Elytra one-third longer than head and prothorax combined and in typical dried specimens covering much less than one-half of abdomen, narrowly overlapping anteriorly, and finely though distinctly rugulose. Abdomen generally large, above with plates rather small and triangular in female, larger and quadrilateral in males, finely punctate rugose, the lateral membrane an opaque black as usual; beneath, shining, sparsely finely punctate and with a few fine hairs. Length to end of elytra 7 mm., breadth 4–6 mm.

Male. Fifth to seventh antennal segments enlarged and distorted, somewhat semicircularly arranged, fifth one-fourth longer and one-third broader than fourth, very obliquely truncate at apex, sixth as long as fourth, broader than long, transversely compressed and with anterior face flat and smooth, the seventh of same length as preceding, robust, wedge-shaped, with anterior face concave and smooth, the eighth to eleventh cylindrical, eighth slightly longer than broad, ninth a bit narrower and longer, tenth almost twice as long as broad, and the eleventh about three times as long as broad and pointed apically.

Female. Outer antennal segments less robust than in male and intermediate not distorted, the fifth slightly shorter than fourth and almost as broad as long, the sixth and seventh somewhat broader and shorter, eighth and ninth as broad as long, tenth slightly longer than broad, and the eleventh about two and one-half times as long as broad and pointed at apex.

This small bluish species is perhaps most closely related to *montanus* Lec. and *afer* Bland. From the former it differs chiefy in being much smaller, has the head and prothorax more granular, less alutaceous, and more finely and densely punctured, the elytra much more finely sculptured, and in the female, the dorsal abdominal plates much less developed. It can best be separated from *afer* by color, the proportionally narrower prothorax, the less grossly sculptured elytra, and the dorsal segments of abdomen. It can be distinguished from small specimens of *impressus* Kirby by its much more rounded head, much narrower prothorax, less coarsely strigulose elytra, and different type of antennae.

The original description was based on "three females from Nebraska, near the Rocky Mountains." It is also found in Colorado and Wyoming. Besides the type, I have examined five specimens belonging to the United States National Museum, two males and a female from Cheyenne, Wyoming, and a male and female from Denver, Colorado, all from the Soltau collection. These were collected during April and May.

### **Meloe impressus** Kirby

Plate 19, figure 22

*Meloe impressa* Kirby, Richardson's Fauna, Bor.-Am., vol. 4, p. 242, 1837.
*Meloe impressus* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, pp. 328–329, 1853; Horn, Wickham Col. of Can., Can. Entom., vol. 28, p. 33, 1896; Blatchley, Col. Ind., p. 1352, 1910; Leng, Cat. Col. Am., p. 159, 1920.
*Meloe americanus* Brandt and Erichson, Nova Acta Acad. Leopold, vol. 16, pp. 118–119, 1831.
*Meloe impressa* var. *nigra* Kirby, Richardson's Fauna Bor.-Am., vol. 4, p. 242, 1837.
*Meloe niger* Henshaw, List. Col. Am., p. 130, 1885; Horn, Wickham Col. of Can., Can. Entom., vol. 28, p. 33, 1896.
*Meloe impressus* var. *niger* Leng, Cat. Col. Am., p. 159, 1920.

*Type*, probably Linnean Society of London or the British Museum—

Of moderate size, ranging in color from dull black with a slight bluish cast, at least on legs and antennae, to black with a bluish or greenish luster. Head broad, transverse diameter greater than from vertex to base of clypeus and at least one-fourth broader than prothorax, occiput arcuate, flattened above, and often with slight notch at vertex, rather coarsely and densely punctured at sides and occiput, more finely and sparsely on front; antennae several segments longer than head and prothorax together, first segment robust, second small though longer than broad, third twice as long as broad in most speci-

mens, and fourth and fifth longer than broad; eyes of moderate size and but slightly convex. Prothorax somewhat broader than long, greatest breadth one-fourth distance from apex, apex over one-half this breadth, base evidently emarginate, sides evenly arcuate anteriorly, almost straight and slightly convergent posteriorly, the disk convex, generally slightly impressed or caniliculate posteriorly and rather coarsely and densely punctured at sides and in front, more sparsely at center where there may be rather definite impunctate areas. Elytra about twice as long as head and prothorax combined and rarely covering one-half of abdomen even in dead specimens, narrowly overlapping at base, and distinctly though not coarsely rugulose-strigulose. Abdomen above with plates of moderate width and length, somewhat shining, finely, sparsely punctured and rugulose; beneath, shining, finely, sparsely punctate with fine hairs arising from each puncture and obscurely scabrose. Length to end of elytra 8–15 mm., breadth 4–7 mm.

Male. Fifth to seventh antennal segments enlarged and distorted, the fifth one-fourth longer and one-fourth broader than fourth, obliquely truncate at apex, sixth slightly longer than fourth, broader than long, flattened, excavated and smooth anteriorly, seventh same length as preceding, wedge-shaped, smooth on anterior face, eighth to eleventh cylindrical, eighth somewhat longer than broad, ninth one-third longer than broad, tenth about twice as long as broad, and eleventh over three times as long as broad and pointed apically.

Female. Intermediate antennal segments enlarged but not distorted, the outer less robust than in male, the fifth a bit shorter than fourth but broader, sixth and seventh gradually shorter, eighth and ninth considerably narrower and barely longer than broad, tenth evidently longer, and eleventh almost three times as long as broad and pointed at apex.

This well-known species is perhaps intermediate in size and robustness between *montanus* Lec. and *tinctus* Lec. The more bluish or greenish specimens can readily be separated from *montanus* Lec. and *angusticollis* Say not only because of the more pronounced color of the latter but also because *impressus* has a much less coarse punctuation of head and prothorax and a much finer type of elytral sculpturing. From *perplexus* Lec., with which it is often confused, it is separated by having a more rounded and transverse prothorax, the prothorax in *perplexus* being in general longer than broad and with sides somewhat sinuate posteriorly. The abdomen in the latter is coarsely regulose, almost as much so as are the elytra, whereas in the former it approaches smoothness. The blacker phases might be confused with some of the western species like *carbonaceus* Lec., *opacus* Lec., or *afer* Bland but these are always decidedly black throughout whereas *impressus* has at least a tinge of green or blue on the antennae or legs. *M. carbonaceus* is also more heavily sculptured and generally larger

and more elongate, *opacus* also much larger and more robust, having elytra and abdomen more rugulose. *M. afer* like tinctus is generally smaller, more coarsely and more deeply punctured.

*M. impressus* Kirby and *M. niger* Kirby are undoubtedly but slight color phases of the same species. Both were secured near latitude 65° in Canada. There are no structural distinctions and since in all parts of its area of distribution, black or at least dark specimens are to be found as well as somewhat metallic individuals, it seems best to suppress *niger*, not even recognizing it as a variety. *M. impressus* has been reported from eastern Canada, the Middle States, and Indiana. In the material before me are specimens from the following localities: a male and female from Toronto, Canada (Van Dyke and Wickham Colls.), a female from Ottawa (Van Dyke Coll.), a male from Sudbury, Canada (Wickham Coll.), a female from Wareham, Massachusetts (Van Dyke Coll.), a female from Elmira, New York (Van Dyke Coll.), a female from Sea Cliff, Long Island, New York (Van Dyke Coll.), a male from Potsdam, New York (Wickham Coll.), a male from Sioux City, Iowa (Soltan Coll., U. S. Nat. Mus.), a male from South Dakota (U. S. Nat. Mus.), and a male from Laramie, Wyoming (Wickham Coll.) It is a spring species, all dated specimens having been taken in April or May.

### **Meloe franciscanus** Van Dyke n.sp.

Plate 19, figure 23

*Type*, California Academy of Sciences, San Francisco, California—

Large, robust, coal black, somewhat shining. Head broad, transverse diameter slightly greater than from vertex to base of clypeus (4 mm.) and barely broader than prothorax; occiput arcuate, much flattened at middle and with a slight notch at center, coarsely, quite closely and regularly punctured, less densely at middle portion of front; antennae very robust, slightly longer than head and prothorax combined, first segment robust, suddenly enlarged apically, second small, as broad as long, third twice as long as broad, and fourth shorter than third and one-third longer than broad; eyes large and prominent, quite convex. Prothorax slightly broader than long (4.25 mm. × 4 mm.), greatest breadth one-third distance from apex, apex almost two-thirds this distance, base evidently emarginate, sides well rounded at anterior third, oblique and somewhat sinuate posteriorly, disk quite flat, basal margin somewhat depressed, surface irregular as the result of several foveae, with an almost complete, very fine median longitudinal impression, and coarsely, somewhat closely and irregularly punctured. Elytra one-third longer than head and prothorax combined, covering about one-half of abdomen, broadly

overlapping anteriorly and very coarsely, irregularly rugulose. Abdomen above with large plates which are distinctly punctate and moderately rugose-strigulose; beneath, rather finely, closely punctured with very fine hairs arising from each puncture and more shining than above. Length to apex of elytra 13 mm., breadth 7 mm.

Male. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, fifth about one-third larger in all diameters than fourth, obliquely truncate at apex, sixth somewhat shorter, as broad as long, compressed, anterior face flattened and smooth, seventh distinctly smaller, wedge-shaped, anterior excavated and smooth, the following segments smaller and cylindrical, eighth as broad as long, ninth slightly longer than broad, tenth one-third longer than broad, and eleventh two and a half times as long as broad and pointed at apex.

Female. Fifth antennal segment just perceptibly broader than preceding, one-fourth longer than broad, sixth shorter, seventh as long as preceding but narrower, the following still narrower, eighth and ninth about as broad as long, tenth a bit longer, and eleventh about twice as long as broad and pointed at apex.

*Holotype* male and *allotype* female (Nos. 2542, 2543, Mus. Calif. Acad. Sci.), collected at Lake Merced, San Francisco, California, March 11, 1910, by Dr. F. X. Williams. Seven other specimens, five females and two males, collected at the same locality during March and April, 1910, by Dr. Williams were also kindly presented to me. These will all be designated as paratypes and one will be deposited in the United States National Museum. I have also seen a male collected by Dr. F. E. Blaisdell at Verdi, Nevada, during April, a female collected by Mr. Ralph Hopping at Camp Greely, altitude 2800 feet, Fresno County, California, March, 1912, and a male collected by Mr. A. M. Adamson at Clear Lake, California, November, 1927. As indicated by the dates, it is both a late autumn as well as a very early spring species.

The large size, general robustness, robust antennae, quite quadrate and flattened prothorax with coarse punctuation, and shining coal black color will in most cases definitely characterize this species and enable it to be readily separated from all others in our fauna. It could be confused only with *carbonaceus* Lec. or *opacus* Lec. From the former, it is distinctly separated by the shorter antennae, the eight and ninth segments being as broad as long, whereas they are at least a fourth longer in *carbonaceus*, by the broader and flatter prothorax, and the distinctly punctate abdomen, which is finely rugose in the latter with the punctures not readily observable. From *opacus*, it is separated by being more shining, by the antennae, the eighth and ninth segments in *opacus* being always distinctly longer than broad,

by the coarser punctuation and more irregular surface of the pronotum as well as the distinct and finely impressed longitudinal line, the coarser sculpturing of the elytra, and the more shining and smooth abdomen. *Meloe barbarus* Lec., which has the same square type of prothorax, is a much smaller species with the head finely and sparsely punctured, the antennae more delicate and not distorted in the male, and the head and prothorax always noticeably small as compared with the afterbody.

### **Meloe opacus** LeConte

Plate 19, figures 26, 27

*Meloe opacus* LeConte, Proc. Acad. Nat. Sci., Phila., p. 354, 1861.

*Type*, LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Large, robust, sooty black, rarely head and prothorax somewhat bluish, opaque, the abdomen and sometimes the elytra slightly shining. Head broad, transverse diameter greater than from vertex to apex of clypeus (4.5 mm. × 3.5 mm.) and about 1 mm. broader than prothorax, occiput rounded at sides, flattened and but slightly convex at middle, without evident notch, very distinctly yet rather finely and densely punctured, more sparsely at center of front; antennae robust, about four segments, longer than head and prothorax combined, first segment robust, gradually enlarged apically, second small, longer than broad, third over twice as long as broad, and fourth two-thirds length of preceding and one-third longer than broad; eyes moderate in size and hardly convex. Prothorax distinctly broader than long (4 mm. × 3.25 mm.), greatest breadth one-fourth distance from apex, apex about two-thirds of this, base moderately emarginate, sides well rounded anteriorly, slightly convergent and a bit arcuate posteriorly, the disk but slightly convex, hardly depressed basally, vaguely caniliculate medially, sometimes with shallow foveae laterally, distinctly, rather finely and closely punctured, less densely at middle. Elytra over twice as long as head and prothorax combined, covering less than one-half of abdomen, narrowly overlapping anteriorly, and moderately rugose, or coarsely granulate, the strigulae not distinctly defined, except laterally. Abdomen above with plates but moderately wide and extending from apex to base of segments, very finely rugulose and with distinct and rather abundant punctuation, the general surface varying from subopaque to shining; beneath, rather coarsely, closely punctured with fine hair arising from each puncture. Length to end of elytra 12–15 mm., breadth 8–10 mm.

MALE. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, the fifth as long as third, two-thirds as broad as long and oblique truncate at apex, sixth fully as long as preceding. As broad as long, very oblique apically, compressed, flattened and smooth anteriorly, seventh two-thirds length of sixth, as broad as long,

wedge-shaped, with anterior face excavated and smooth, the following segments narrow and cylindrical, eighth barely longer than broad, ninth one-fourth longer than broad, tenth more than one-third longer than broad, and eleventh almost three times as long as broad and pointed apically.

Female. Fifth antennal segment about equal in breadth and length to fourth, sixth slightly shorter, seventh still shorter, about one-third longer than broad, the following slightly narrower, eighth and ninth of about equal length and slightly longer than broad, tenth a third longer than broad, and eleventh almost three times as long as broad and pointed apically.

This northern species is the most distinctly opaque of our species. Its opaqueness, finer puncturation, less flattened pronotum and rugose or granular type of elytra will always separate it from *franciscanus*, a species which shares part of its territory. From *carbonaceus* Lec., with which it is most apt to be confused because of structural similarity as well as from the fact that they occupy much of the same region, it is separated by its generally broader prothorax, finer and denser puncturation of both head and prothorax, more robust antennae with shorter and broader eighth and ninth segments, and the very evident punctuation of the abdomen. Smaller and less typical, generally mountain forms can be separated from *afer* Bland by the distinct punctuation of the abdomen as well as finer punctuation of head and prothorax. From the darker phases of *montanus* Lec., it can always be separated as the latter has coarse and well defined rugulae.

Besides the type collected at Mendocino City, California, I have carefully examined specimens from the following localities: a female collected at Corvallis Oregon by M. G. F. Moznette (Van Dyke Coll.) and carefully compared with the type, a typical male from Coeur d'Alene, Idaho (Van Dyke Coll.), a typical male from Pullman, Washington (U. S. Nat. Mus.), a somewhat less robust specimen from the slopes of Mount Lyell, California, altitude about 11,000 feet, collected by myself in July, 1892, and a series of nine specimens submitted by Mr. Ralph Hopping. These last are from the following places: a female from Corvallis, Oregon, April 10, 1924; a female from Mara, British Columbia, 1921 (H. Blurton Coll.); two males and four females from Vernon, British Columbia, collected on various dates during April and May by Wm. Ruhnyinn, R. C. Treherne, S. Paterman, and Ralph Hopping; and a male with slightly bluish head, prothorax and legs, collected on One Mile Creek, Princeton, British Columbia, May 25, 1922, by H. H. Thomas.

### **Meloe carbonaceus** LeConte

Plate 19, figure 24

*Meloe carbonaceus* LeConte, Smith. Misc. Coll., vol. 6, pp. 155–156, 1863.

*Type*, LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Of moderate size, sooty black, the legs and antennae sometimes slightly bluish. Head moderately broad, transverse diameter about equal to distance from vertex to apex of clypeus (3.5 mm.) and slightly greater than breadth of prothorax; occiput well rounded laterally, moderately flattened at middle and with vague notch at center, moderately coarsely to rather finely and closely punctured, especially posteriorly, often sparsely at center of front; antennae moderately robust, longer than head and prothorax combined by at least two segments, first segment robust, gradually enlarged apically, second small, slightly longer than broad, third twice as long as broad, and fourth shorter than third and somewhat broader; eyes moderately large and slightly convex. Prothorax somewhat ovate, barely broader than long, greatest breadth one-fourth distance from apex, apex two-thirds width of this, base evidently emarginate, sides well rounded anteriorly, convergent and perceptibly arcuate posteriorly, the disk slightly convex, declivous posteriorly, moderately coarsely, closely and evenly punctured. Elytra twice as long as head and prothorax combined, covering about one-half of abdomen, rather broadly overlapping anteriorly and rather coarsely rugulose. Abdomen above with plates of moderate size, finely and distinctly rugose, punctures hardly discernible; beneath, moderately coarsely, closely punctured, very fine hair arising from each puncture. Length to end of elytra 12 mm., breadth 8 mm.

MALE. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, fifth longer than fourth, almost as long as third and not quite twice as broad as long; sixth about as long as fourth, almost as broad as long, compressed, flattened and smooth, on anterior face, seventh shorter, narrower, wedge-shaped, excavated and smooth on anterior face, the following segments narrower and cylindrical, eighth one-fourth longer than broad, ninth somewhat longer, tenth over one-third longer than broad, and eleventh not quite three times as long as broad and pointed apically.

FEMALE. Fifth antennal segment about one-third longer than broad, sixth and seventh gradually shorter, eighth one-fourth longer than broad, ninth slightly longer, tenth over one-third longer than broad, and eleventh not quite three times as long as broad and pointed apically.

This is one of the most difficult of all our species to distinguish. It is undoubtedly of the same stock as *montanus* Lec., being in fact little more than a black phase of it. Typical specimens from Wyoming and Montana have the prothorax somewhat narrower than that of

*montanus*, the elytra smoother, and the strigulae less sharply defined. Specimens from California, one of which was compared with the type, cannot be defined separately from typical *montanus* except by color. From *franciscanus* n.sp., *carbonaceus* is separated by being generally smaller, less robust, less shining, with the pronotum more convex and less deeply punctured. From *californicus* n.sp., it may be distinguished by the shorter, more convex and more ovate prothorax, and the less coarse and sparse pronotal punctuation. Its opaqueness might lead to its being confused with *opacus* Lec. but the latter is in general larger, with broader and more finely punctured prothorax, antennae gradually longer, the elytra less conspicuously sculptured, and the abdomen distinctly punctate. *M. afer* Bland, a rather close but smaller relative, has coarser and deeper punctuation of head and prothorax, the prothorax broader, more campanulate, and more distinctly canaliculate.

Besides the LeConte type, which was from "Nebraska near the Rocky Mountains," I have studied specimens from the following localities: two males from Laramie, Wyoming (Wickham Coll.) and a male and female collected by R. A. Cooley in Gallatin County, Montana (Wickham Coll.), all taken during the latter part of April. With these, I have placed three California specimens, a female collected by Mr. J. O. Martin at Susanville, Lassen County, June, 1924; a broken female collected at McCloud, by Mr. J. D. Riggs (Van Dyke Coll.); and a female collected by myself at Carrville, Trinity County, June 4, 1913. The last of these, the one from which the drawing was made, was very carefully compared with the LeConte type and found to agree almost perfectly. In general the California specimens are larger and have the elytra more coarsely strigulose than are those from the Rocky Mountain region.

### **Meloe afer** Bland

Plate 19, figure 25

*Meloe afer* Bland, Proc. Entom. Soc., Phila., vol. 3, p. 70, 1864.

*Type*, American Entomological Society, Philadelphia—

Small, short, coal black, and subopaque. Head of moderate breadth, transverse diameter slightly greater than from vertex to apex of clypeus (3.25 mm. × 3 mm.) and distinctly broader than prothorax, occiput well rounded laterally, moderately flattened at middle, and with slight notch at center, coarsely, deeply, regularly, and rather closely punctured; antennae short, barely longer than head and pro-

thorax combined, first segment robust, gradually enlarged apically, second small, slightly longer than broad, third twice as long as broad, and fourth one-third longer than broad and shorter than preceding; eyes of moderate size and hardly convex. Prothorax barely broader than long (2.25 mm. × 2 mm.) greatest breadth one-fourth distance from apex, apex two-thirds of this breadth, base distinctly emarginate, sides rounded, subangulate anteriorly, convergent and vaguely sinuate posteriorly, the disk slightly convex, caniculate posteriorly, depressed basally, and coarsely, deeply, and quite closely punctured. Elytra not twice as long as head and prothorax combined, covering less than one-half of abdomen, narrowly overlapping anteriorly, and rather finely and distinctly rugulose. Abdomen above with plates of but moderate width and length and finely rugose, sometimes smoother, more shining, and with punctures evident; beneath, coarsely to finely punctured, somewhat shining. Length to end of elytra 8–10 mm., breadth 5–7 mm.

MALE. Fifth to seventh antennal segments enlarged and distorted, semicircularly arranged, fifth segment about one-fourth longer and broader than fourth, obliquely truncate at apex, sixth as long as fourth and fully as broad as long, compressed and with anterior face flattened and smooth, seventh slightly longer and narrower than preceding, wedge-shaped, with inner face excavated and smooth, the following segments narrower and more cylindrical, eighth barely longer than broad, ninth about one-third longer than broad, tenth about twice as long as broad, and eleventh three times as long as broad and pointed apically.

FEMALE. Fifth antennal segment shorter than fourth, sixth and seventh of same length but narrower, eighth and ninth barely longer than broad, tenth one-third longer than broad, and eleventh less than three times as long as broad and pointed apically.

Typical specimens closely resemble *tinctus* Lec. in size and general appearance but they differ in color, being always of a coal black or sooty black, and the prothorax is slightly broader. From the black species mentioned before, they differ primarily by being smaller. The characteristic deep puncturation of head and prothorax and the rather fine yet distinctly rugulose elytra should also assist in identifying them.

Besides the type, I have carefully examined specimens from the following localities: a typical male from Cheyenne, Wyoming (Hubbard and Schwarz Coll., U. S. Nat. Mus.), typical female from Berkeley, Colorado (Wickham Coll.), typical female from Montana (J. B. Smith Coll., U. S. Nat. Mus.), large atypical female from Helena, Montana (Hubbard and Schwarz Coll., U. S. Nat. Mus.), typical male from eastern Washington (C. V. Piper Coll., U. S. Nat. Mus.), three typical males and one female from Ritzville, eastern Washington (M. C. Lane Coll. in Blaisdell Coll.), a male submitted

by M. C. Lane from Ritzville, a typical female which was compared with the type and collected forty miles east of McCloud, California (Van Dyke Coll.), a slightly atypical male collected by myself at Forest Hill, Placer County, California, besides a male and female somewhat larger and with broader and more deeply caniliculate prothorax, the male from Los Angeles County, most likely the semi-desert northeastern portion (Coquillett Coll., U. S. Nat. Mus.), the female from Riverside County, California (E. R. Leach Coll.). It is in general like *carbonaceus* Lec.; a species of the semi-arid Great Basin. It is also a spring species, the more southern specimens appearing even as early as February (Coquillett specimen) and the more northern as late as May (Montana specimen).

### **Meloe barbarus** LeConte

Plate 19, figure 28

*Meloe barbarus* LeConte, Proc. Acad. Nat. Sci., Phila., p. 354, 1861.

*Type,* LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Rather small, moderately robust, black and shining. Head subquadrate, as broad as long from vertex to base of clypeus, slightly broader than prothorax; occiput slightly arcuate, hind angles well rounded, sides slightly arcuate, front moderately flattened, surface subsericeous, slightly shining, rather finely and sparsely punctured, almost impunctate at middle; antennae rather short, reaching from two to three segments beyond hind angles of prothorax, moniliform, differing but little between the sexes, first segment gradually clavate, second small but longer than broad, third about twice as long as second and slightly broader or about twice as long as broad; eyes of moderate size and slightly convex. Prothorax subquadrate, slightly broader than long, base distinctly but not deeply emarginate, sides broadly rounded in front, almost straight or faintly sinuate and slightly convergent behind, the hind angles rounded, disk flattened or just perceptibly convex, median caniliculation finely impressed at center and broadly widened out into a deep triangular impression at base, the surface irregular and rather coarsely, irregularly, and somewhat sparsely punctured. Elytra about twice as long as head and prothorax combined, surface uneven though not conspicuously strigulose. Abdomen above with dorsal plates of moderate size and rather finely rugulose; beneath, finely, sparsely punctured and shining, the punctures with short, fine hair. Length to end of elytra 7–9 mm., breadth 4–7 mm.

Male. Fourth, fifth, sixth, and seventh antennal segments gradually shorter and shining, not distorted, 5–6 somewhat broader, 8–11 considerably narrower than preceding and moderately finely pilose,

8–10 gradually narrower, the eleventh about one and a half times length of tenth and pointed apically.

FEMALE. Fourth to seventh antennal segments hardly narrower than third and gradually shorter, the following similar to male.

This species stands out among the American species, because of its quadrate, flattened prothorax, rather small size, and non-distorted male antennae. Even the females can be readily separated from any of the other species found within its area of distribution.

The type, which I have carefully studied, was collected by Dr. C. M. Bache, of the United States Coast and Geodetic Survey, on the island of Santa Barbara, off the coast of southern California. It is also to be found widely spread over the coastal area of the entire Pacific coast and is in the main a winter species, being generally found during November, December, January, or February. I have seen specimens from the following places: a male and female from Victoria, British Columbia, March 22, 1903 (Wickham Coll.); a male from British Columbia, April 4, 1904 (Wickham Coll.); a female from Corvallis, Oregon (Wickham Coll.); Oregon (Hubbard and Schwarz Coll., U. S. Nat. Mus.); twenty-nine specimens from Trinity County, California, submitted by Mr. C. R. Leach, November 11 to January 1, 1918–1920; five specimens from San Francisco, California, November 17–February 27, various years (Colls. Blaisdell, Van Duzee, and Van Dyke); a pair from Berkeley, California, in early spring (Van Dyke Coll.); Niles, Alameda County, California, January 24, 1904 (Van Dyke Coll.); Kern County, California (U. S. Nat. Mus.); and a specimen from San Clemente Island, California, March 23, 1918, collected by Mr. J. R. Slevin (Mus. Calif. Acad. Sci.).

### **Meloe laevis** Leach

Plate 19, figures 29, 30 .

*Meloe laevis* Leach, Trans. Linn. Soc., London, vol. 11, pp. 249–250, table 18, fig. 4, 1815; Brandt and Erichson, Mon. Gen. Meloes, p. 135, 1831; Champion, Biol. Centr.-Am., vol. 4 (2), p. 366, table 17, fig. 3, 1892; Borchmann, Junk's Col. Cat., Pars 69, p. 126, 1917.

*Treiodous barranci* Dugès, Naturaleza, vol. 1, p. 102, table 1*a*, figs. 1, 2, 1870; Wellman, Can. Entom., vol. 42, p. 396, 1910.

*Meloe cordillerae* Chevrolet, Guerin's Icon. Reg. Anim., vol. 3, Ins. p. 133, table 35, fig. 6, 1829–44; Laporte, Hist. Nat. Ins., vol. 3, p. 278, 1840.

*Treiodous cordillerae* Dugés, Annal. Mus. Michoacana, vol. 2, p. 35, 1889.

*Meloe montanus* Chevrolet, Dej. Cat., ed. 3, p. 242, 1837 (nec. Lec.).

*Meloe opacus* Motschulsky, Bull. Mosc., vol. 45 (2), p. 48, 1873.

*Meloe sublaevis* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 7, p. 84, 1854; Jour. Acad. Nat. Sci., Phila., vol. 4 (2), p. 38, 1858; Col. Kansas and N. Mex., p. 56, 1865.

*Meloe tridentatus* Jiminez, Gaceta Med. de Mex., vol. 2, no. 15, p. 225, 1866.

*Meloe tucci* Penafiely Barranco, Gaceta Med. de Mex., vol. 2, no. 11, cum. fig., 1866.

*Types: M. laevis* Leach in British Museum; *M. sublaevis* Lec. in LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Moderate to large size, robust, dull black, subopaque. Head variable in size and shape, generally large and broad, distinctly broader than long from vertex to base of clypeus, considerably broader than prothorax; occiput moderately or well rounded, hind angles rounded, sides arcuate, front flattened, opaque, very finely and sparsely punctured; antennae robust, barely projecting behind hind angles of prothorax, not differing sexually except in being slightly larger in the males, second segment small and transverse, 3–8 gradually increasing in breadth, third somewhat triangular and about twice as broad as long, fourth slightly shorter and more cylindrical, fifth, sixth, and seventh still shorter yet similar in shape to preceding, ninth and tenth of same length but a bit narrower than eighth and slightly longer, the eleventh about three times as long as broad and conical; eyes moderate in size, but slightly convex and hardly projecting beyond sides of head. Prothorax variable, slightly to a full millimeter broader than long, base moderately emarginate, sides broadly rounded anteriorly, thence almost straight or finely sinuate and convergent to founded hind angles, disk slightly convex with median caniliculation finely impressed and extending from base to center, the surface dull like head and very finely and sparsely punctured. Elytra over one-third longer than head and protherax, rather finely, quite obscurely rugulose, surface as a result almost smooth. Abdomen above with dorsal plates of but moderate size in males and very small in females, only about one-half length of segment, and obscurely rugose; beneath, more evidently rugose and finely, sparsely punctured and shining. Length to end of elytra 12–15 mm., breadth 8–10 mm.

The males, as stated above, have slightly heavier antennae than the females. They have in addition much less developed abdomens, in many cases the elytra almost entirely covering them, and with the dorsal plates of the abdomen almost of normal size, the same being much reduced in size and semicircular in outline in the females.

This species is very definitely separated from all of our other species except *barbarus* Lec. by having the antennae simple in both sexes, by being a dull black and with the finest and most sparsely placed punctuation of all. It is very variable not only as regards

size but also as to the shape of both head and prothorax as shown in the illustrations (pl. 19, figs. 29, 30). This species, especially those specimens with the long and narrow prothorax, is closely related to the Mexican *Meloe gracilicornis* Champ., the latter differing principally by having, according to Champion (1892), "slender antennae in both sexes, this difference being especially noticeable in the female sex." Among the species in our own fauna, it could be confused only with the females of *strigulosus* Mann., but the more definitely strigulose elytra of the latter should make them readily distinguished.

*Meloe laevis* Leach is to be found widely distributed throughout the southwestern part of our country and according to Champion (1892) ranges from Costa Rica north through the highlands of Central America and Mexico to Arizona, New Mexico, and Colorado. I have seen specimens from the Tres Marias Islands, off the west coast of Mexico, November 3, 1907 (Koebele Coll., Calif. Acad. Sci.) as well as several specimens from Colorado Springs, Colorado, June (Wickham, and Hubbard and Schwarz Coll., U. S. Nat. Mus.), Albuquerque, New Mexico (Wickham Coll.), Nogales, July 8, Huachuca Mountains, July, and Chiricalua Mountains, July, Arizona (numerous collections now in Calif. Acad. Sci.), Williams, Arizona (Hubbard and Schwarz Coll., U. S. Nat. Mus.), and Texas Pass, July 20, 1917, W. M. Wheeler Coll. (Van Dyke Coll.).

## Genus **Gynaecomeloe** Wellman

Plate 16, figures 7, 8

*Megetra* Horn (nec. Lec.), Trans. Am. Entom. Soc., vol. 2, p. 139, 1868; Henshaw, List Col. Am., p. 130, 1885.

*Colospasta* Horn (nec. Lec.), Proc. Calif. Acad. Sci., ser. 2, vol. 4, p. 438, 1894.

*Gynapteryx* Wellman (nec. Fairm.), Entom. News, vol. 20, p. 19, 1909.

*Gynaecomeloe* Wellman, Entom. News, vol. 21, p. 217, 1919; Can. Entom., vol. 42, p. 391, 1910; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1917; Leng, Cat. Col. Am., p. 159, 1920.

Genotype, *Gynaecomeloe opaca* (Horn)—

The genus *Gynaecomeloe* was established by Wellman in 1910. In it was placed that peculiar species first described by Horn (1868), from female specimens, as *Megetra opaca*. Later, when the winged males were found, Horn transferred it to *Colospasta* and still later

Wellman removed it to *Gynapteryx*. *Gynaecomeloe* differs from *Megetra* principally by having fully winged males, the elytra normally developed and covering the abdomen, and the appendages to the tarsal claws almost as long as the claws themselves and parallel to them, not one-third the length and divergent as in *Megetra*. In *Colospasta*, both sexes are winged; though the wings may be somewhat reduced in some species, otherwise the essential characters are the same. In fact *Gynaecomeloe* is but an offshoot of this quite polymorphic genus, only differing by being sexually dimorphic with the female wingless and with reduced elytra. From *Gynapteryx* Fairm., a Chilean genus which also has winged males and wingless females, it can be easily distinguished by the type of claws, both blades of the claw in *Gynapteryx* being of equal length as in *Meloe*.

*Gynaecomeloe* is a meloid genus characterized by being sexually dimorphic, the males fully winged and with the elytra normal, straight sutured, and covering the abdomen; the females wingless, with the elytra much shorter than the abdomen, meeting each other at the suture in front and divergent behind; the antennae rather short, robust yet filiform, eleven-segmented, proportionally slightly longer in the males but otherwise similar in the sexes; the labrum not deeply emarginate; the vertex not abnormally elevated; anterior femora without sericeous patches of hair; the penultimate segment of tarsi complete, not lobed; the hind tibial spurs quite similar though unequal in length, acute and alike in the sexes; the tarsal claws simple, their appendages about two-thirds their length and parallel or but slightly divergent; the metasternum in the male long and the mesocoxae not overlapping the hind coxae, the metasternum short in the female and the mesocoxae slightly overlapping the hind coxae. In our fauna it is the only genus among the Meloidae having winged males and apterous females. Only two species are known, both restricted to rather definite regions in the more arid parts of southern California.

## SYNOPTIC KEY

Head and prothorax decidedly opaque, elytra rather coarsely reticulate; prothorax in male subquadrate, in female broadly arcuate at sides, in both considerably broader than long ..... **opacus** (Horn)

Head and prothorax somewhat shining, elytra but moderately rugose, almost smooth in front; prothorax in male with sides subangulate, in female with sides broadly rounded, in both but little broader than long ..... **parvicollis** sp. nov.

**Gynaecomeloe opaca** (Horn)

*Megetra opaca* Horn, Trans. Am. Entom. Soc., vol. 2, p. 139, 1868; Henshaw, List. Col. Am., p. 130, 1885.

*Colospasta opaca* Horn, Proc. Calif. Acad. Sci., ser. 2, vol. 4, p. 438, 1894.

*Gynapteryx opaca* Wellman, Entom. News, vol. 20, p. 19, 1909.

*Gynaecomeloe opaca* Wellman, Entom. News, vol. 21, p. 217, 1910; Can. Entom., vol. 42, p. 301, 1910; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1917; Leng, List Col. Am., p. 159, 1920.

*Type*, Horn Collection, Museum of the Academy of Sciences, Philadelphia—

Of moderate size, coal black, head and prothorax opaque, elytra moderately shining, a few short hairs on head and elytra, especially at base of latter, the legs and underside more densely pilose. Head slightly broader than prothorax, somewhat triangular, vertex just perceptibly convex, sides almost straight and convergent forwards, surface minutely, closely punctured giving opaque appearance, and with somewhat larger, sparsely placed punctures, more numerous toward sides; antennae stout, reaching slightly beyond hind angles of female, second segment small, quite transverse in male, third fully three times as long as wide in female, almost twice breadth in male, segments 4–11 quite cylindrical and but little longer than broad, the proximal segments of female generally narrower than those of male; eyes not prominent; hardly projecting beyond side margins. Prothorax in male, subquadrate, one-third broader than long, apex narrowly emarginate at middle, base slightly emarginate, sides somewhat arcuate; in female, markedly arcuate or almost angulate, broadest in front of middle, over one-third broader than long, apex rather broadly emarginate base as in male; disk slightly convex, with fine basal margin and surface sculpturing like head. Elytra in male completely covering abdomen, two-fifths broader than prothorax, over three-eighths longer than broad, base quite transverse, humeri evenly rounded, sides almost straight and parallel, apices individually rounded, disk normally convex and rather coarsely, deeply, irregularly cribrate, with a few evident hairs at base and a number of short, inconspicuous ones scattered over surface; in female, covering but little more than one-half of the enlarged abdomen, about one-fourth broader at base than prothorax, divergent, the sutural margins straight and approximate, sides moderately arcuate, the apices individually rounded. Abdomen in female much exposed beyond elytra, with dorsal plates extending full length of segments and about one-third of dilated abdomen, finely, obscurely rugose, the lateral membrane opaque as usual; beneath, finely, sparsely punctured, somewhat shining, and with a few short hairs scattered over surface, in dried specimens often much wrinkled. Legs of moderate length and quite robust. Males, length 7–12 mm., breadth 3.5–5 mm; females, length to apices of elytra 9–13 mm., breadth 4–9 mm.; the greater measurements nearer normal.

According to Horn (1868), his description was based on specimens "Found running on the ground in March and April at Temacula, California, and one specimen from Fort Yuma." At a later date (1894), he speaks of having seen three series of specimens, one set of "Six taken by Mr. Gabb near Los Angeles about thirty years ago; a second series of eleven from Morrison, taken about ten or twelve years ago, with no special locality other than southern California; a third series from Mr. Coquillett, taken near Los Angeles in 1893. The first two series are all females. In the last series three are males and four females." My first specimens, a pair taken in May, were received from Mr. Coquillett and, as I remember it, were said to have been found near Lancaster in the Mohave Desert. Other specimens studied besides those in the Horn collection, were two females collected in Antelope Valley (Mohave Desert), May 29, 1905, by Mr. F. Grinnell (Van Dyke Coll.), a pair of depauperized specimens from Haiwee, Inyo County, California, May 5, 1926, collected by Mr. J. O. Martin (Calif. Acad. Sci. Coll.), and three females from Banning, California, collected by Mr. W. G. Wright (Calif. Acad. Sci. Coll.). Judging from this data, it would apear that this species ranges throughout the arid area of southeastern California from Yuma north into Inyo County, northwest into the so-called Mohave Desert and Antelope Valley, and westerly from Yuma into western Riverside County.

The males of this species, as stated by Horn (1894), closely resemble some of the species of *Colospasta* and the females are superficially like some of the species of the genus *Meloe*. The most characteristic specific features are the very opaque head and prothorax, the coarsely sculptured elytra, and the quadrate type of prothorax in the male.

### **Gynaecomeloe parvicollis** Van Dyke, n.sp.

Plate 16, figures 7, 8

*Type*, California Academy of Sciences, San Francisco, California—

Of moderate size, black, slightly shining. Head, prothorax, base of elytra, and underside somewhat hairy. Head not broader than prothorax in male, slightly broader in female, somewhat triangular, vertex hardly convex, sides almost straight and convergent forwards, surface closely, rather finely punctured, giving granular appearance, especially noticeable in female, the males with numerous large punctures especially near hind angles; antennae stout, barely reaching hind margin of prothorax in female, slightly beyond in male, second segment small and transverse, third about twice as long as broad, 3–7 gradually wider in female, 3–11 of about uniform width, more or less

cylindrical and slightly longer than broad in male, the eleventh segment as long as two preceding and pointed at apex; eyes not prominent, hardly projecting beyond side margins of head. Prothorax transverse, about one-third broader than long; in male, much larger than in female, with sides slightly divergent forward from base and strongly rounded and narrowed near apex; in female, with sides strongly divergent from base, strongly rounded in front of middle and narrowed at base; the disk slightly convex, with surface irregular and rather sparsely punctured, indistinctly so in female. Elytra in male completely covering abdomen, base almost twice as wide as prothorax, and the length twice the breadth, sides slightly sinuate near middle and wider posteriorly, with the apices broadly individually rounded, disk rugose and with several elevated lines indistinctly indicated; in the female, covering about one-half of the enlarged abdomen, about one-third broader at base than prothorax, divergent, the sutural margins meeting in front, divergent posteriorly, the apices broadly individually rounded, surface subopaque, slightly irregular but not rugose. Abdomen in female, dorsal plates extending full length of segments and about one-third breadth of dilated abdomen, finely obscurely rugose, the lateral membrane opaque; beneath, somewhat shining and very finely, sparsely punctured in both sexes, in dried specimens often much wrinkled. Legs long and delicate. Males, length 7–11 mm., breadth 4–5.5 mm.; females, length 9–10 mm. to apex of elytra, breadth 7 mm., the abdomen generally extending fully 5 mm. beyond elytra.

*Holotype, allotype* (Nos. 2544, 2545, Mus. Calif. Acad. Sci.) and a number of designated *paratypes* from a series of twenty-four specimens, eleven males and thirteen females, collected by myself, April 23, 1921, in the Pinoche hills of southeastern San Benito County, California.

This species differs from *opaca* (Horn), by being in general somewhat smaller, with the head and prothorax in both sexes proportionally smaller, also less quadrate in male, somewhat shining in male and subopaque in female; the elytra with sides less parallel in the male, shorter in the female, and surface sculpturing much planed down so that it is hardly rugose even in the male, whereas in the other species it is very coarsely reticulate in both sexes.

### **Brachyspasta** Van Dyke, n.gen.

Plate 17, figure 10

Black, subopaque, rather short and robust, without wings and with reduced elytra, superficially resembling one of the smaller black species of *Meloe* or even more closely the female of *Gynaecomeloe parvicollis* n.sp. Head somewhat triangular (holotype) or subquadrate (paratype); clypeus transverse and with front margin barely emarginate; antennae (pl. 17, fig. 10*a*) more or less filiform, rather

short and robust, barely reaching hind margin of prothorax, ten-segmented, first segment robust and clavate as usual, second small and transverse, third about twice as long as broad and cylindrical, third to tenth very gradually increasing in width, fourth to ninth gradually shorter, the tenth formed of the ankylosed tenth and eleventh segments, with line of union vaguely indicated, and about as long as two preceding segments united, narrowed and rounded at apex; eyes not prominent, projecting but little beyond side margin of head, the anterior margin slightly emarginate. Prothorax rather small, subhexagonal in shape, slightly broader than long, apex about one-half breadth of base and sides rounded in front of middle and convergent forwards to apex and backwards to base. Scutellum small, broadly triangular. Elytra covering about two-thirds of dilated abdomen, sutural margins approximate in front, gradually divergent and rounded into apex posteriorly. Abdomen dilated. Legs rather long and delicate; front femora without sericeous patch of hair; all tibiae elongate, somewhat compressed and slightly arched, the tibial spines double, subequal, acute (in the holotype, certain of the spines of the middle and hind tibiae are longitudinally cleft so as to have lateral spicules, not observable in paratype); tarsi moderately robust, the penultimate segment not lobed, the claws moderately robust and each furnished with an acute, somewhat divergent tooth (pl. 16, fig. 10*b*).

Genotype *Brachyspasta wickhami* Van Dyke, n.sp.—

This genus is defined by a number of characters such as the type of antennae and tarsal claws which place it in the tribe Colospastini. Though superficially resembling the female of *Gynaecomeloe*, it differs apparently in having both sexes apterous (the paratype being a male as far as I can judge without dissection), the antennae but ten-segmented, and the tarsi claws with the teeth shorter and more divergent. It also resembles *Megetra* and *Cysteodemus* in having both sexes wingless and the tarsal claws provided with short acute and divergent teeth, but differs by having ten-segmented antennae. The reduced number of antennae segments, as well as other characters, shows its close relationship to *Cordylospasta fulleri* Horn, as previously mentioned.

### **Brachyspasta wickhami** Van Dyke, n.sp.

Plate 16, figure 10

Of small or moderate size, black, subopaque, with a few short, inconspicuous hairs scattered over the body, the legs quite definitely hairy. Head one-sixth broader than prothorax, with vertex transverse, hind angles rounded, sides straight and slightly convergent forward (holotype) or somewhat arcuate and more parallel (paratype), the front flattened, the general surface granular and with a few scattered

punctures in the middle and numerous larger, umbilicate punctures near hind angles (puncturation less evident in paratype). Prothorax slightly transverse, the disk moderately convex with tendency toward formation of lateral lobes, with well marked basal margin, and surface granular and with a few moderate-sized but obscure punctures scattered over surface. Elytra at base two-sevenths broader than prothorax, much elevated in front, the sutural margins straight and approximate anteriorly, divergent posteriorly and with sides somewhat arcuate, the surface rather finely, definitely reticulate (less pronounced in paratype). Abdomen dilated, with dorsal plates longitudinally covering entire segment and transversely about one-third breadth of abdomen, finely rugose and somewhat shining, the lateral membrane dull and sooty black. *Holotype*, length 10 mm. to apices of elytra, abdomen extending several millimeters beyond, breadth 7 mm.; *paratype*, length 6 mm. to apices of elytra, breadth 4 mm.

Holotype and paratype, collected at Grand Junction, Colorado, by Professor H. F. Wickham and now in his collection.

As stated previously this species superficially very closely resembles the female of *Gynaecomeloe parvicollis* n.sp. but, outside of the generic differences, differs in having a more evidently punctured head, prothorax more gibbous dorsally, and the elytra more convex and with a coarser puncturation. It can of course always be distinguished from some of the smaller species of *Meloe* by its generic characters such as the ten-segmented, rather short, and more or less filiform antennae, and toothed tarsal claws.

## Genus **Megetra** LeConte

Plate 16, figure 9

*Megetra* LeConte, Thomson's Arcana Naturae, vol. 1, p. 127, 1859; Class. N. Am. Col., I, Smith. Misc. Coll., vol. 3, p. 269, 1862; LeConte and Horn, Class. Col. N. Am., ed. 2, Smith. Misc. Coll., vol. 26, p. 416, 1883; Harold, Col. Hefte, vol. 13, p. 105, 1877; Henshaw, List Col. Am., p. 130, 1885; Dugès, Bull. Soc. Zool. Fr., p. 580, 1886; Champion, Biol. Centr.-Am. Col., vol. 4 (2), p. 369, 1892; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1917; Leng, Cat. Col. Am., p. 159, 1920.

Genotype, *Megetra cancellata* (Brandt et Erichson), according to Wellman (1910)—

The genus *Megetra* was formally established by LeConte in 1859, in Thomson's Arcana Naturae where it is referred to in the following manner:

I formally included in the genus *Meloe cancellatus*, Br. and Er., and *C. vittatus*, Lec. (Proc. Acad., VI, 330), which differ by the elytra being much shorter than the abdomen and diverging, though not imbricate as in *Meloe*. The ungues are

armed with a tooth as in *Cysteodemus*. I now, however, fully agree with the opinion of Lacordaire (Gen. Col., V, 660), that they should form a new genus, for which I propose the name *Megetra*.

As indicated above, the genus thus differs from *Meloe* by not having the elytra laterally imbricated. It also differs by having the antennae short and filiform, not more or less moniliform, and by having the tarsal claws toothed, not cleft and with appendages as long as the claws themselves. From *Cysteodemus* where it was at one time placed, it differs fundamentally only in having the elytra short and divergent, covering but a small part of the enlarged abdomen, not large, united along the suture, and covering all except the extreme apex of the abdomen as in *Cysteodemus*. From its other wingless associates in the tribe Colospastini, it diverges from *Gynaecomeloe* by having both sexes wingless and the teeth to its tarsal claws short and divergent from the claws, and from *Brachyspasta* by having eleven-segmented antennae. Champion (1892) states that "According to von Harold (Col., vol. 13, p. 105), the genus *Pseudomeloe*, Fairm. & Germain, which contains numerous species from the South-American Andes, is synonymous with *Megetra;* but this is probably incorrect, as *Pseudomeloe* is particularly stated to have the two portions of each claw equal." This opinion of Champion is correct, for I have carefully examined specimens of *Pseudomeloe* and found that the claws are completely cleft as in *Meloe*. In addition, I noted that the antennae are somewhat moniliform and the posterior pair of tibial spines dissimilar, characters which also place it closer to *Meloe* and in the tribe Meloini.

*Megetra* may therefore be fully characterized as a genus of meloid Coleoptera, in which both sexes are wingless and with the elytra reduced in size, not laterally imbricated but somewhat divergent and covering but a small portion of a greatly enlarged abdomen; the head more or less quadrilateral, the labrum not lobed, the antennae eleven-segmented, very short and filiform, second segment small, third distinctly longer than fourth, and the eyes not prominent; the prothorax small and not spined; the anterior femora without sericeous patches of hair though such are to be found on the lower inner face of the anterior tibae; the penultimate segment of tarsi complete, not lobed; the hind tibial spurs equal and acute; and the tarsal claws with a prominent, acute, and divergent tooth near the base, the blade of the claw itself not serrate.

Two species of *Megetra* are known, *Megetra cancellata* (Br. and Erich.), a speceis found in various parts of Mexico and in the form

of a subspecies just crossing our border into southern Arizona, and *Megetra vittata* (Lec.), a well-known species found in various parts of the southwestern part of the United States as well as in Mexico.

SYNOPTIC KEY

Head and prothorax subopaque, prothorax fully a third wider than long and considerably narrowed basally, the red or yellow markings of elytra confined to the diverging reticulations and therefore somewhat ramifying, larger species ..... **cancellata** (Brandt and Erich.)

Head and prothorax moderately shining, prothorax hardly wider than long and with sides posteriorly parallel or but little convergent basally, the yellow markings of elytra in the form of a well defined vitta near lateral margins, smaller species ..... **vittata** Lec.

## **Megetra cancellata** (Brandt and Erichson)

*Meloe cancellatus* Brandt and Erichson, Mon. gen. Meloes, Nov. Act. Leopold-Car., vol. 16, p. 141, table 8, figs. 9, 9*b*, 1831.

*Cysteodemus cancellatus* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 7, p. 224, 1854 (1856); Jour. Acad. Nat. Sci., Phila., vol. 4 (2), p. 38, 1858.

*Megetra cancellata* LeConte, Thomson's Arcana Naturae, vol. 1, p. 127, 1859; Annals and Mag. Nat. Hist. vol. 6 (4), p. 404, 1873; Dugès, An. Mus. Michoacana, vol. 2, p. 38, 1889; Champion, Biol. Centr.-Am. Col., vol. 4 (2), p. 370, 1892; Wellman, Can. Entom., vol. 42, p. 392, 1910; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1917.

*Megetra cancellata hoegei* Dugès, An. Mus. Michoacana, vol. 2, p. 39, 1889; Champion, Biol. Centr.-Am., vol. 4 (2), p. 370, 1892; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1917.

*Megetra cancellata* var. Champion, Biol. Centr.-Am., vol. 4 (2), p. 370, 1892; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1917.

*Type*, in Berlin Museum—

Of large size, robust, head and prothorax subopaque, the elytra and abdomen smooth, shining, black with posterior margin of head and the elevated reticulations of elytra reddish, in the variety the color has disappeared from the reticulations near the sutural margins, and posterior margins of abdominal segments flavous. Head quadrate, one-fourth broader than from vertex to base of clypeus and but slightly broader than prothorax, hind margin transverse, sides slightly arcuate, front flattened and with a few scattered punctures; antennae short, about reaching hind margin of prothorax, filiform, first segment clavate, second small and transverse, third more than twice as long as wide and cylindrical, 4–10 gradually shorter and faintly more robust outwardly, eleventh over one-third longer than preceding and rounded apically; eyes of fair size but not projecting beyond side margins of head. Prothorax fully a third wider than long and almost as wide as head, apex and base emarginate, sides obliquely diverging from base, faintly sinuate, rounded in front of middle and rather rapidly obliquely narrowed to apex; disk slightly convex, with well

developed basal margin, slightly impressed laterally, finely granular as result of minute punctuation and with a few scattered small punctures. Elytra leaf-like, divergent, about twice as long as head and prothorax, the disk convex and very definitely and coarsely reticulate, with several punctures within each depressed area, the epipleura broad, punctured, and rugose. Abdomen greatly enlarged in the female, with dorsal plates covering but posterior two-thirds of segments and only about one-third as broad as abdomen, finely rugose, the membrane dull; beneath, somewhat shining and very finely, sparsely punctured. Legs moderately robust. Length to apices of elytra 17 mm., breadth 14 mm.

The type, which is in the Berlin Museum, was described as from Mexico. Champion (1892) gives Tula and Pachuca in Hidalgo (Hoge) as localities for the typical species and Villa Lerdo in Durango for the variety. The typical form with the elevated red reticular markings covering the entire elytra as shown in the illustration of Brandt and Erichson (1831) is undoubtedly confined to Mexico. The variety mentioned and figured by Champion (1892) is the one which has crossed our border. I have a specimen in my collection, taken on Mount Washington, near Nogales, Arizona, September 7, 1927, by Mr. J. August Kusche, which is without doubt this form. LeConte states that what he considered as *M. cancellata* was probably a variety of *M. vittata* and for this reason the early citations of the former species have been dropped from our catalogues. There is a possibility that some of these specimens were, like my specimen, Champion's variety of *cancellata*.

The differential characters between this variety of *cancellata* and the true *vittata* have been given by Champion and are quoted by me in the discussion following the latter species. This variety, or more truly subspecies, being without a name, I will now designate it as *Megetra cancellata championi* n.ssp., and consider as the holotype the specimen in the British Museum from which the illustration given in the Biologia Centrali-Americana was made.

### **Megetra vittata** (LeConte)

Plate 17, figure 9

*Cysteodemus vittatus* LeConte, Proc. Acad. Nat. Sci., Phila., vol. 6, p. 330, 1853; Col. Kansas, Smith. Contrib., vol. 11, p. 16, pt. 2, fig. 9, 1859; Jour. Acad. Nat. Sci., Phila., vol. 4 (2), p. 38, 1858.

*Megetra vittata* (LeConte), Thomson's Arcana Naturae, vol. 1, p. 127, 1859; Henshaw, List Col. Am., p. 130, 1885; Champion, Biol. Centr.-Am., Col., vol. 4 (2), p. 370, 1892; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1918; Leng. Cat. Col. Am., p. 159, 1920.

*Type*, LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Of medium size, robust, shining, glabrous, black with a broad reddish or yellowish vitta near the sides of each elytron, the posterior margins of the abdominal segments flavous, and sometimes the posterior portion of the head red. Head quadrate, transverse diameter greater than from vertex to base of clypeus and about one-sixth broader than prothorax, hind margin transverse, sides almost straight and parallel, hind angles rounded, front but slightly convex and with a few scattered punctures; antennae short, barely reaching hind margin of prothorax, filiform, first segment short and clavate, second, small and transverse, third, over twice as long as broad and cylindrical, fourth, two-thirds length of preceding, the following slightly but increasingly shorter and broader to tenth, the eleventh, about a third longer than preceding and rounded apically; eyes not prominent, not projecting beyond side margins of head. Prothorax rather small, variable, slightly broader than long, apex and base emarginate, sides straight or somewhat divergent from base, rounded in front of middle and rapidly narrowed to apex; disk slightly convex, with distinct basal margin, two shallow impressions on each side, the surface smooth and shining and with a few small, scattered punctures. Scutellum generally with a deep fovea. Elytra somewhat leaf-like, divergent, covering but small portion of abdomen, the disk slightly convex, grossly punctured, and more or less reticulate, the epiplemae broad and meeting the upper surface quite acutely. Abdomen generally much enlarged, in length fully one-half the entire length of insect, dorsal plates occupying about two-thirds the length of segments and less than one-third the breadth, finely rugose, the membrane subopaque or faintly shining, beneath shining and finely sparsely punctured, often very rugose in dried specimens. Legs rather long and delicate. Length to apex of elytra 11–15 mm., breadth 10–15 mm.

The LeConte type was collected in New Mexico by Dr. Wislizenus. The species has also been recorded from the same state by others, as well as from Arizona. In Mexico it has been found, according to Champion (1892), at Pinos Altos in Chihuahua (Buchanan-Hepburn), Chihuahua City, and Villa Lerdo in Durango (Hoge). I have studied specimens from Alpine, Texas, July 22, collected by Wickham (Van Dyke Coll.), Davis Mountains, Texas (C. Duncan, Calif. Acad. Sci. Coll.), and Verde Valley, Arizona, August 15, 1926 (H. Brisley, Van Dyke Coll.).

This species is, according to Champion (1892), very near a variety of *cancellata* Br. and Erich. (here designated as *Megetra cancellata championi* n.ssp.), but differs from it "by its much smaller size, the more shining and less transverse thorax, and the shorter and deeply foveate elytra; the reddish or yellow sublateral vitta on each elytron

well defined, with (at most) very short divergent branches on either side. The sculpture of the elytra is very different from that of either of the forms of *M. cancellata* Brandt & Er."

## Genus **Cysteodemus** LeConte

Plate 17, figs. 11, 12

*Cysteodemus* LeConte, Ann. Lyc. Nat. Hist., New York, vol. 5, p. 158, 1851; Proc. Acad. Nat. Sci., Phila., vol. 6, p. 330, 1853; Col. Kansas, Smith. Contrib., vol. 11, p. 16, pl. 2, fig. 10, 1859; Class. N. Am. Col., I, Smith. Misc. Coll., vol. 3, p. 269, 1862; Henshaw, List Col. Am., p. 130, 1885; Champion, Biol. Centr.-Am., vol. 4 (2), p. 369, 1892; Borchmann, Junk's Col. Cat., Pars 69, p. 117, 1917; Leng, Cat. Col. Am., p. 159, 1920.

Genotype, *Cysteodemus armatus* Lec.—

The genus *Cysteodemus* was established by J. L. LeConte in 1851 and in it were placed two species, *armatus* and *wislizeni*, which were described at the same time. It was defined in the following manner: "Antennae filiformes, articulis arcte connexis 3$^{io}$ haud longiore; tarsi filiformes, unguiculis dente basali armatis; elytra amplissima, connata. Generi Meloi proximus, et elytris amplissimus, non imbricatis valde distinctus." Two years later in his Synopsis of the Meloides of the United States, LeConte somewhat modified his definition of the genus so as to allow of the admittance of *Meloe cancellatus* Br. and Er. He made two divisions of the genus, his division "*a.* Elytra divergentia, abdomine multo breviore," receiving besides this last species, a new species described as *C. vittatus;* and his division "*b.* Elytra amplissima, connata," receiving *C. wislizeni* and *C. armatus.* Later on he came to the conclusion that the members of the first division were not congeneric with the second, so in 1859 he erected the genus *Megetra* to receive the two species placed in his division "*a,*" thus leaving the other two species as the sole members of *Cysteodemus* and they have remained the only species in the genus to the present time. As stated while discussing *Megetra,* this genus was separated from *Cysteodemus* primarily because the elytra were small and divergent and covered but a small portion of a generally enlarged abdomen, whereas the true *Cysteodemus* had the elytra large, connate along the suture, and almost or entirely covering the abdomen. It can be distinguished from *Brachyspasta* by its eleven- instead of ten-segmented antennae; from *Gynaecomeloe* in that both sexes are apterous and have inflated connate elytra and tarsal claws with sharp divergent teeth; and from

*Meloe, Poreospasta,* and *Henous* by its toothed tarsal claws, not completely cleft to base and with blades of equal length; and, in addition, from *Meloe* and *Poreospasta* in that it has not moniliform antennae.

It may be defined as being a genus of the Meloidae characterized by having both sexes wingless, the elytra large, inflated, connate along the suture, and either entirely covering the abdomen or all but its apex; the head distinctly longer than broad, the labrum slightly emarginate in front, the palpi short, the antennae short, filiform, eleven-segmented, the second segment short, the third subequal with fourth or scarcely longer, and the eyes of but moderate size and slightly convex; the prothorax small, somewhat hexagonal and laterally tubercular or spined; the scutellum small and transverse; the legs long and slender, the front femora without sericeous patches of hairs, the tibial spines of all legs double and acute, and the tarsal spurs rather long, robust, and with a short, acute, and divergent tooth near base.

Two species are known, one found in the arid parts of southeastern California and the other in Texas, New Mexico, Arizona, and Mexico. Very little is known concerning their biology.

SYNOPTIC KEY

Above, black or with a faint aeneous tint, subopaque; prothorax acutely spined laterally; elytra grossly, irregularly, reticulate, larger areas posteriorly, the disk moderately flattened and sulcate near suture in front.....**armatus** Lec.

Above, brilliant violet, blue or greenish, shining; prothorax but slightly tuberculate laterally; elytra more or less regularly reticulate, depressions more foveiform, the disk not flattened though slightly sulcate close to suture in front .....**wislizeni** Lec.

### **Cysteodemus armatus** LeConte

Plate 17, figures 11, 12

*Cysteodemus armatus* LeConte, Ann. Lyc. Nat. Hist., New York, vol. 5 (4), p. 158, 1851; Proc. Acad. Nat. Sci., Phila., vol. 6, p. 330, 1853; Thomson's Arcana Naturae, vol. 3, p. 126, pl. 13, fig. 3, 1859; Lacordaire, Gen. Col., vol. 5, p. 661, atl., pl. 59, fig. 2, 1859; Wellman, Can. Entom., vol. 42, p. 391, 1910.

*Type,* LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Head and prothorax rather small, elytra large and much inflated, black, subopaque, with a faint aeneous tinge, legs long, rather delicate,

hind tibiae sometimes arched and generally bluish. Head about as wide as long from vertex to apex of clypeus, occiput very convex, often subangulate, notched at vertex, sides slightly arcuate and divergent forwards, hind angles broadly rounded, front flattened, coarsely, irregularly punctured; antennae short, filiform, about reaching hind margins of prothorax, first segment robust and clavate, second small and transverse, third slightly more than two and a half times as long as broad, fourth similar, 5–10 gradually shorter, the eleventh equal to third and narrowed and rounded apically; eyes of but moderate size and hardly convex. Prothorax slightly transverse, transversely convex at middle and with a well marked subacute spine projecting laterally on each side from this prominence, surface punctuate in front, rugose, and with a few punctures elsewhere. Elytra large and inflated, slightly arcuately narrowed forwards, the disk flattened, sulcate near suture in front, often with sutural intervals cristate, the surface coarsely, deeply, and irregularly reticulate, the foveae larger posteriorly, the apices divergent and individually subangulate. Abdomen with but two apical segments projecting between the separated apices of the elytra, granular and sparsely punctate above, smoother and sparsely, finely punctured beneath. Length 8–18 mm., breadth 5–11 mm., normal about 13 × 10 mm.

The specimens from which the original description was made were obtained on the desert near the Colorado River in California, mainly on the creosote bush, *Larrea tridentata* var. *glutinosa* Jepson (*Larrea mexicana*). I have examined specimens from the following localities in California: Yuma, March 13, 1898; Holtville, March 13, 1924; Palm Springs, Riverside County, May, 1927; Antelope Valley, Mohave Desert, May 29, 1905; and from Barstow. According to Mr. Alonzo C. Davis, this species is very abundant at times and locally distributed, being found both on the ground as well as on the bushes. The female makes a burrow in the ground near the base of *Larrea* and lays its eggs *en masse* in the pit, the mass being about the size of an ordinary pea and the individual eggs very small, elongate, and white.

This species can be readily separated from *wislizeni* Lec. by its black or almost black color, its spined pronotum, and the very coarsely, irregularly reticulate elytra with the disk somewhat flattened above.

### **Cysteodemus wislizeni** LeConte

*Cysteodemus wislizeni* LeConte, Ann. Lyc. Nat. Hist., New York, vol. 5, p. 158, 1851; Proc. Acad. Nat. Sci., Phila., vol. 6, p. 330, 1853; Col. Kansas, Smith. Misc. Contrib., vol. 11, p. 16, pl. 2, fig. 10, 1859; Thomson's Arcana Naturae, vol. 3, p. 126, 1860; Jour. Acad. Nat. Sci., Phila., vol. 4 (2), p. 38, 1858; Dugès, An. Mus. Michoacano, vol. 2, p. 40, 1889; Champion, Biol. Centr.-Am., Col., vol. 4 (2), p. 369, pl. 17, fig. 10, 1892.

*Type*, LeConte Collection, Museum of Comparative Zoology, Cambridge, Mass.—

Head and prothorax rather small, elytra large and much inflated, a deep violet color, sometimes greenish, shining, legs long and delicate. Head slightly narrower than length from vertex to apex of clypeus, occiput quite convex, notched, surface coarsely, irregularly and rather closely punctured; antennae similar to those of preceding species but shorter, third segment about twice as long as wide, fourth slightly longer, fifth equal to third, sixth to fourth, 7–10 gradually shorter, eleventh two and a half times as long as broad and pointed at apex; eyes of moderate size and barely convex. Prothorax slightly transverse, bluntly angulate at sides above or slightly tuberculate, disk rather deeply canaliculate at middle, and with puncturation like head. Elytra large and inflated, sides evenly arcuate, the disk very convex and rather evenly arcuate from apex to near base where it projects forward in a prominent manner, the surface deeply and more or less regularly reticulate, the apices individually rounded. Abdomen with two apical segments projecting between apices of elytra, above rather coarsely punctured and shining, beneath somewhat shining and sparsely, finely punctured. Length 11–18 mm., breadth 9–11 mm.

The LeConte type was collected in New Mexico by Dr. Wislizenus. I have seen specimens from New Mexico, including one from Mesilla Dam, April 25, 1924 (Coll. J. O. Martin, Mus. Calif. Acad. Sci.). It is also recorded from Arizona and according to Champion (1892) has been taken in Chihuahua (Hoge) and Villa Lerdo in Durango (Hoge), Mexico. "Found in numbers by Herr Hoge in Northern Mexico during his second expedition."

The differentiating characters separating it from *armatus* Lec. have already been given in the key and in the discussion of that species, so need not be repeated.

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## EXPLANATION OF PLATES

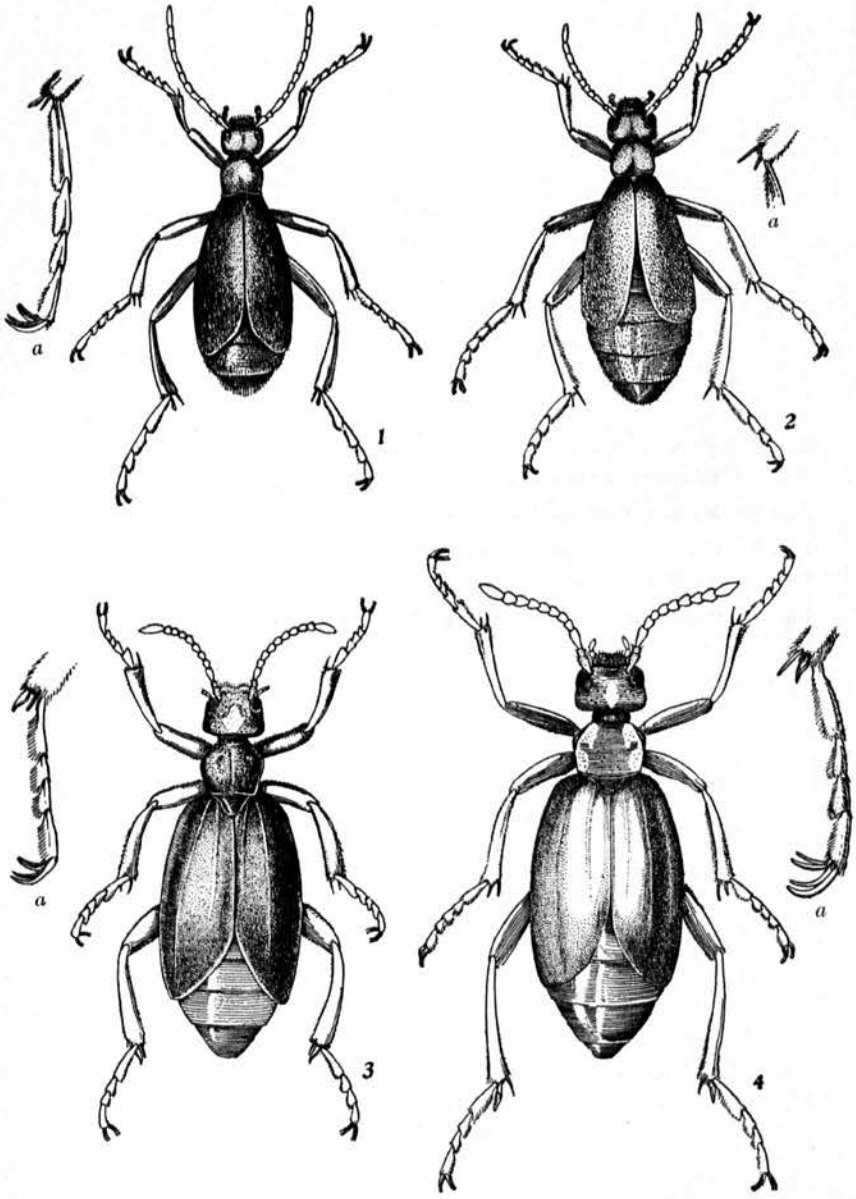
### PLATE 15

Fig. 1. *Henous confertus* (Say); *a*, apex of hind tibia and tarsus.

Fig. 2. *Henous parvulus* (Hald.); *a*, apex of hind tibia and part of first tarsal segment.

Fig. 3. *Poreospasta sublaevis* (Horn); *a*, apex of hind tibia and tarsus.

Fig. 4. *Poreospasta polita* Horn; *a*, apex of hind tibia and tarsus.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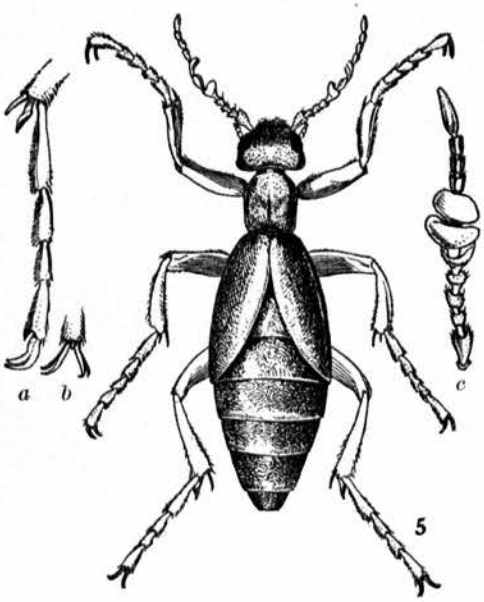
## PLATE 16

Fig. 5. *Meloe strigulosus* Mann., male; *a*, apex of hind tibia and tarsus; *b*, tarsal claws viewed from above; *c*, antenna viewed from above.

Fig. 6. *Meloe strigulosus* Mann., female.

Fig. 7. *Gynaecomeloe parvicollis* sp. nov., male; *a*, apex of hind tibia and tarsus.

Fig. 8. *Gynaecomeloe parvicollis* sp. nov., female; *a*, apex of hind tibia and tarsus.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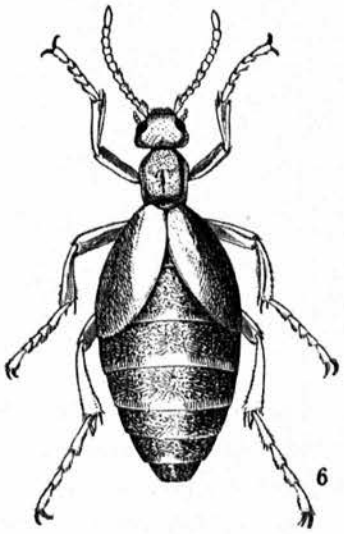
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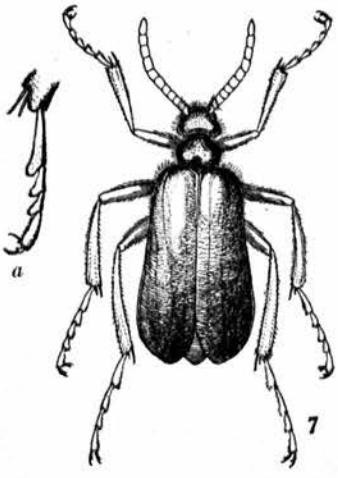
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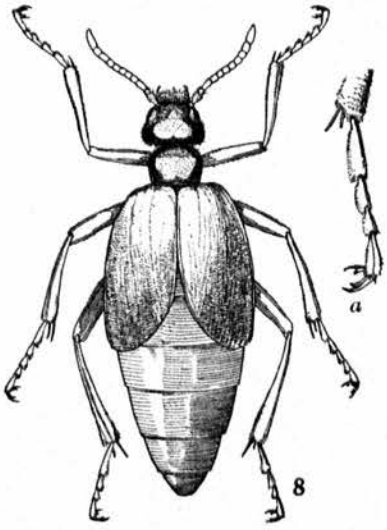
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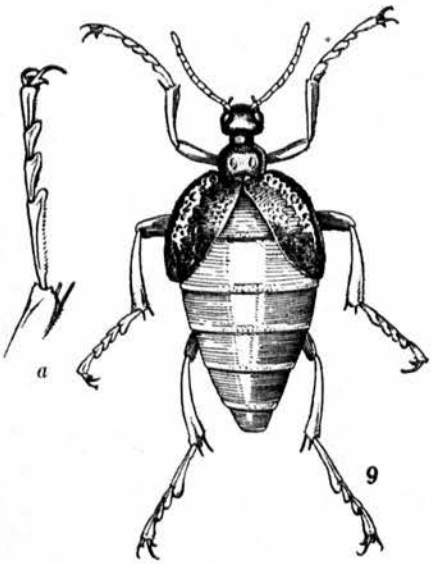
## PLATE 17

Fig. 9. *Megetra vittata* (Lec.); *a*, apex of hind tibia and tarsus.

Fig. 10. *Brachyspasta wickhami* sp. nov.; *a*, antenna; *b*, apex of hind tibia and tarsus.

Fig. 11. *Cysteodemus armatus* Lec.; *a*, apex of hind tibia and tarsus.

Fig. 12. *Cysteodemus armatus* Lec., side view.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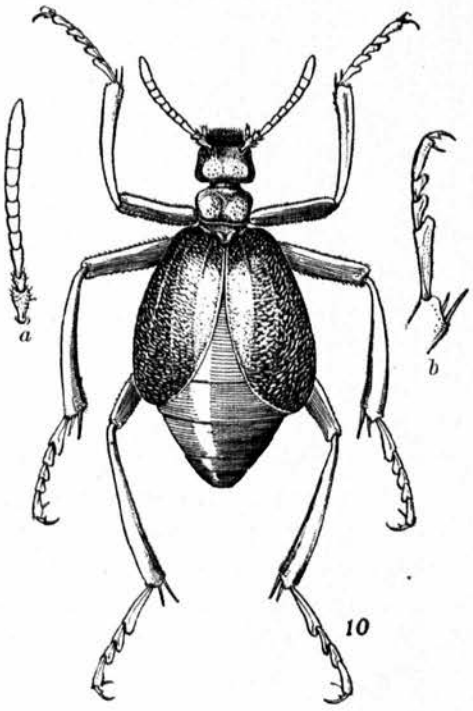
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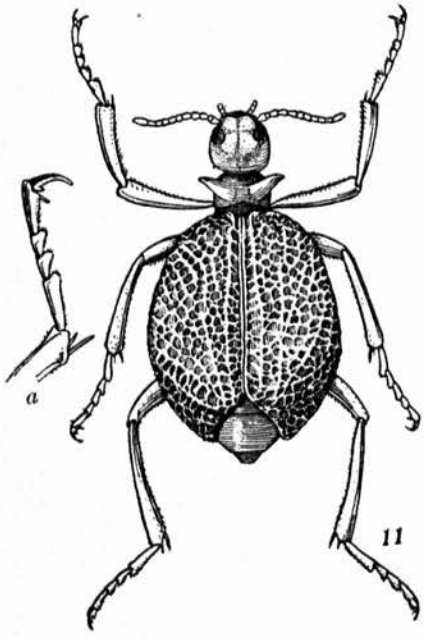
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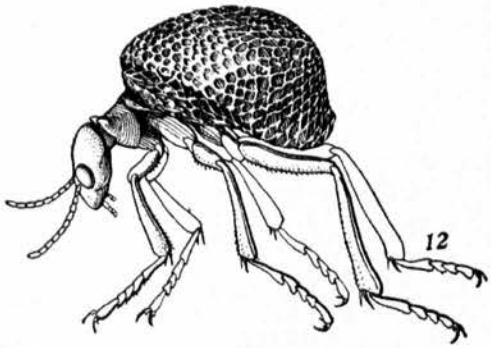
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PLATE 18

Fig. 13. Head and prothorax of *Meloe americanus* Leach.
Fig. 14. Head and prothorax of *Meloe americanus occidentalis* var. nov.
Fig. 15. Head and prothorax of *Meloe moerens* Lec.
Fig. 16. Head and prothorax of *Meloe californicus* sp. nov.
Fig. 17. Head and prothorax of *Meloe angusticollis* Say.
Fig. 18. Head and prothorax of *Meloe perplexus* Lec.
Fig. 19. Head and prothorax of *Meloe quadricollis* sp. nov.
Fig. 20. Head and prothorax of *Meloe montanus* Lec.
Fig. 21. Head and prothorax of *Meloe tinctus* Lec.

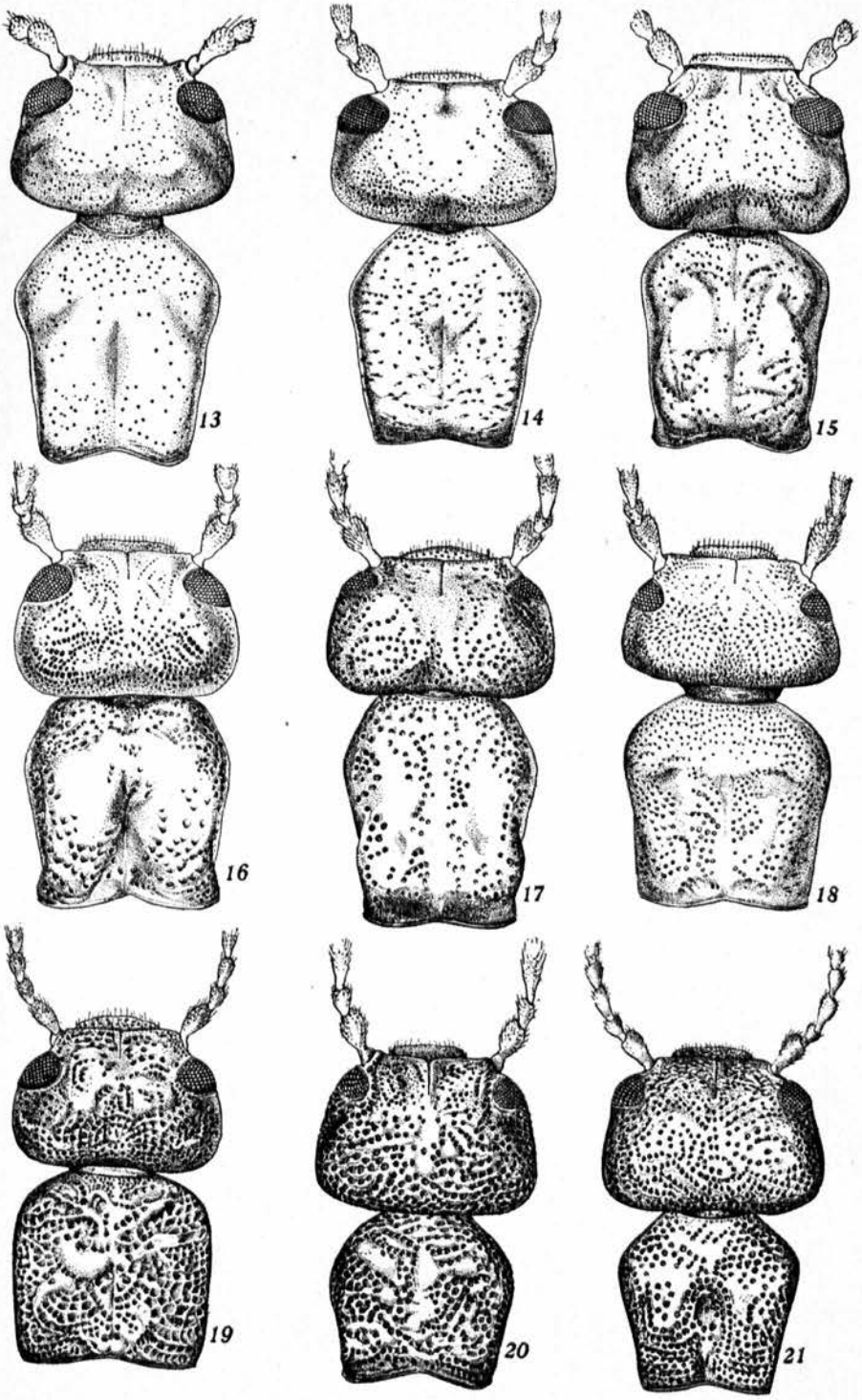
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PLATE 19

Fig. 22. Head and prothorax of *Meloe impressus* Kirby.

Fig. 23. Head and prothorax of *Meloe franciscanus* sp. nov.

Fig. 24. Head and prothorax of *Meloe carbonaceus* Lec.

Fig. 25. Head and prothorax of *Meloe afer* Bland.

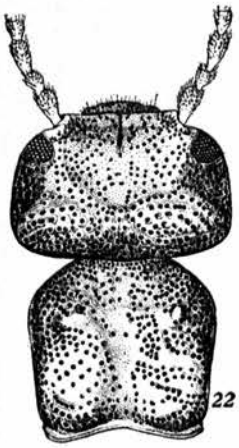
Fig. 26. Head and prothorax of *Meloe opacus* Lec., broad and more typical form.

Fig. 27. Head and prothorax of *Meloe opacus* Lec., narrower form.

Fig. 28. Head and prothorax of *Meloe barbarus* Lec.

Fig. 29. Head and prothorax of *Meloe laevis* Leach, broad and more typical form.

Fig. 30. Head and prothorax of *Meloe laevis* Leach, narrower form.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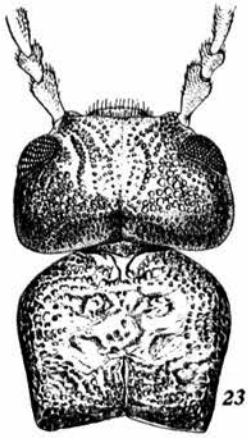
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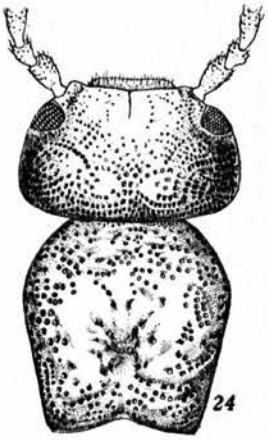
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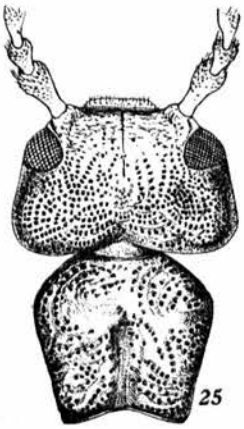
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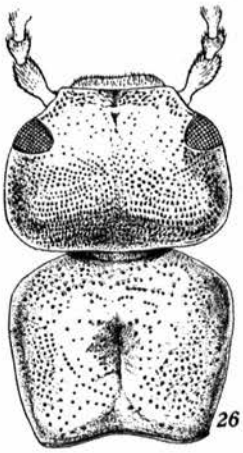
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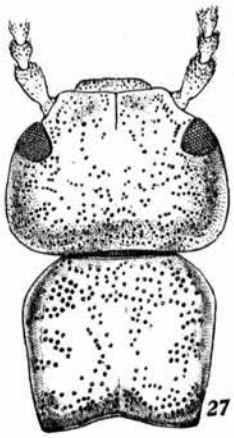
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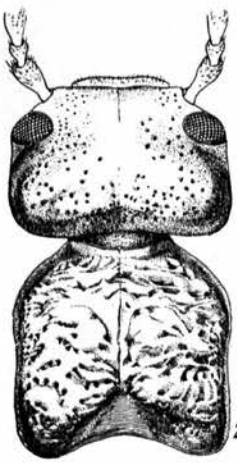
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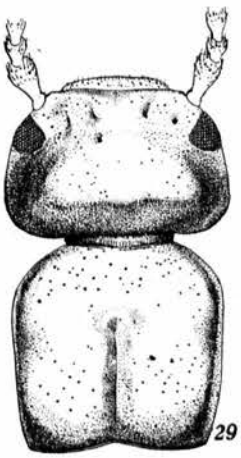
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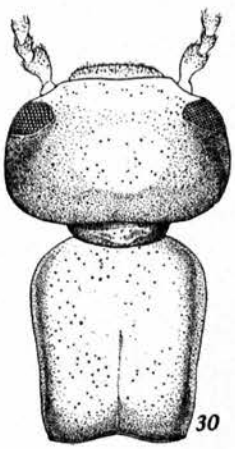
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